101.11:5-4120-210-15

TM 5-4120-210-15

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

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OPERATOR, ORGANIZATIONAL,
DIRECT SUPPORT, GENERAL SUPPORT,
AND DEPOT MAINTENANCE MANUAL

AIR CONDITIONER: FLOOR MOUNTING;
AIR COOLED; 8 HP, AC, 3 PHASE, 400 CYCLE;
38,000 BTU, 416 VOLT (FAIRCHILD STRATOS MODEL
VEA4–3) FSN 4120–690–7869
38,000 BTU, 208 VOLT (FAIRCHILD STRATOS MODEL
VEA4–3–102103) FSN 4120–825–6626
38,000 BTU, 208 VOLT (FAIRCHILD STRATOS MODEL
VEA4–3–102103MOD) FSN 4120–225–9753

SAFETY PRECAUTIONS

BEFORE OPERATION

Do not connect main power cable unless master circuit breaker is pulled out.

Avoid bodily contact with refrigerant. Do not inhale refrigerant or allow it to contact the eyes. When refrigerant is released from system, provide maximum ventilation around the air conditioner.

Drain the refrigerant system completely prior to opening the system for maintenance and repair. Wear goggles to prevent the possibility of refrigerant coming in contact with the eyes.

DURING OPERATION

The refrigerant, R–12, used in the air conditioner, is injurious to the eyes and skin. If leaks occur in the refrigerant system, immediately and thoroughly ventilate the area.

Do not operate the unit when panels are removed.

Disconnect power source when making repairs or inspections that necessitate contact with operating components.

AFTER OPERATION

Refrigerant decomposes in the presence of fire, forming a toxic gas. Do not release refrigerant when a torch or other flame-producing apparatus is being used for repairs.

Avoid breathing smoke when using the monobromotrifluoromethane type fire extinguisher.

Be extremely careful when using a carbon tetrachloride fire extin-

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CHANGE }
No. 4 }

Gen

AIR COND
AC, 3 PHA
STRATO

50,000 BTU, 208

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Page2 of cover. Add the follo

> The burning of pol
> polyurethane foan
> burned or heated
> precautions shoul
> equivalent to that
> approved by the N
> Bureau of Mines,
> ventilation is inac
> conditions, includi
> environment.

Order of the Secretary of the Army:

FRED C. WEYAND
General, United States Army
Chief of Staff

cial:

ERNE L. BOWERS
lajor General, United States Army
he Adjutant General

tribution:

To be distributed in accordance with DA Form 12-25C, (qty rqr block No. 566). Organization
intenance requirements for Environmental Equipment, Air Conditioners, 38,000 BTU.

CHANGE
No. 3

Operato
Sup
AIR CONDI
8 HP, AC, 3
(FAIRC

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Page B-1. Appendix B is sup

BASIC
TROOI

B-1. Scope

This appendix lists basic issue
installed or authorized which
conditioner and are required by
for operation, installation, or

quantity of the item upon which the allowances are based, e.g., ft, ea, pr, etc.

e. Quantity Authorized (Items Troop Installed or Authorized Only). This column indicates the quantity of the item authorized to be used with the equipment.

Section III. ITEMS TROOP INSTALLED OR AUTHORIZED LIST

(1) SMR code	(2) Federal stock number	(3) Description Ref No. & mfr code	Usable on code	(4) Unit meas	(5) Qty auth
	7520-559-9618	CASE, OPERATIONS AND MAINTENANCE PUBLICATIONS		EA	1
	4130-542-3339	FILTER, AIR		EA	1

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:

VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Change
No. 2

Oper
General

AIR CONDI
8 HP, AC, 3
(FAIRC

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(FAIRCHIL

TM 5-4120-210-15, 6 Octobe
as follows:

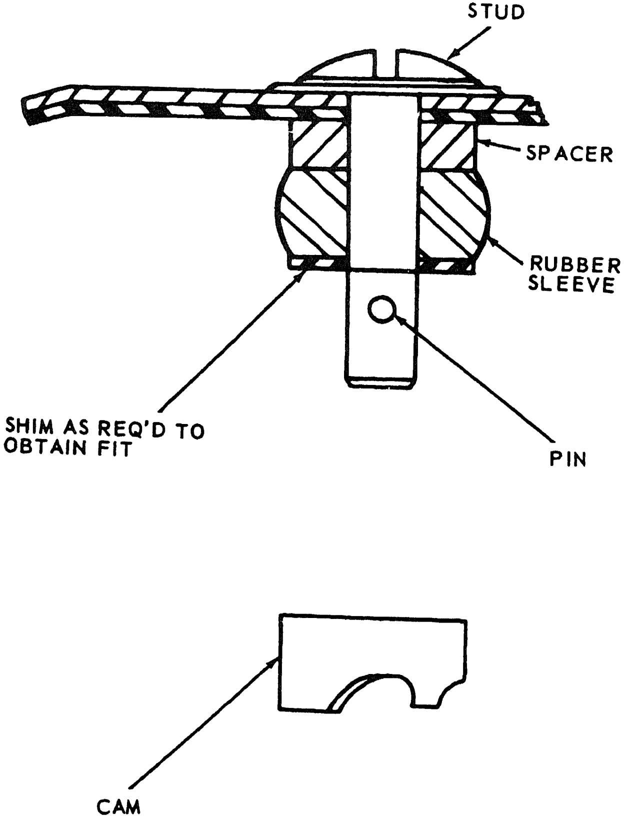
Cover and title pages are
above.

General. All references to
Model VEA 4-3-102103 Modifie
Conditioner, FSN 4120-225-975

b. Installation. Refer to figure 3-5.1 for installation of fastener kits.

NOTE

Spacer is not required for all of the fasteners and is only included in the appropriate kits.



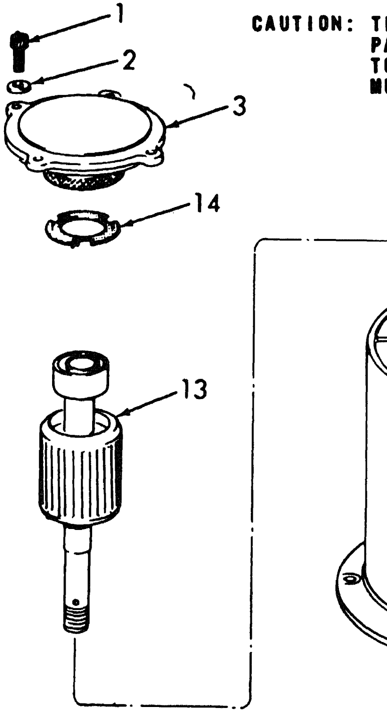
ME 4120-210-15/3-5.1 C2

3-5.1 Stud fastener.

Page 4-21. Paragraph 4-29*d* (2

e note in its entirety.

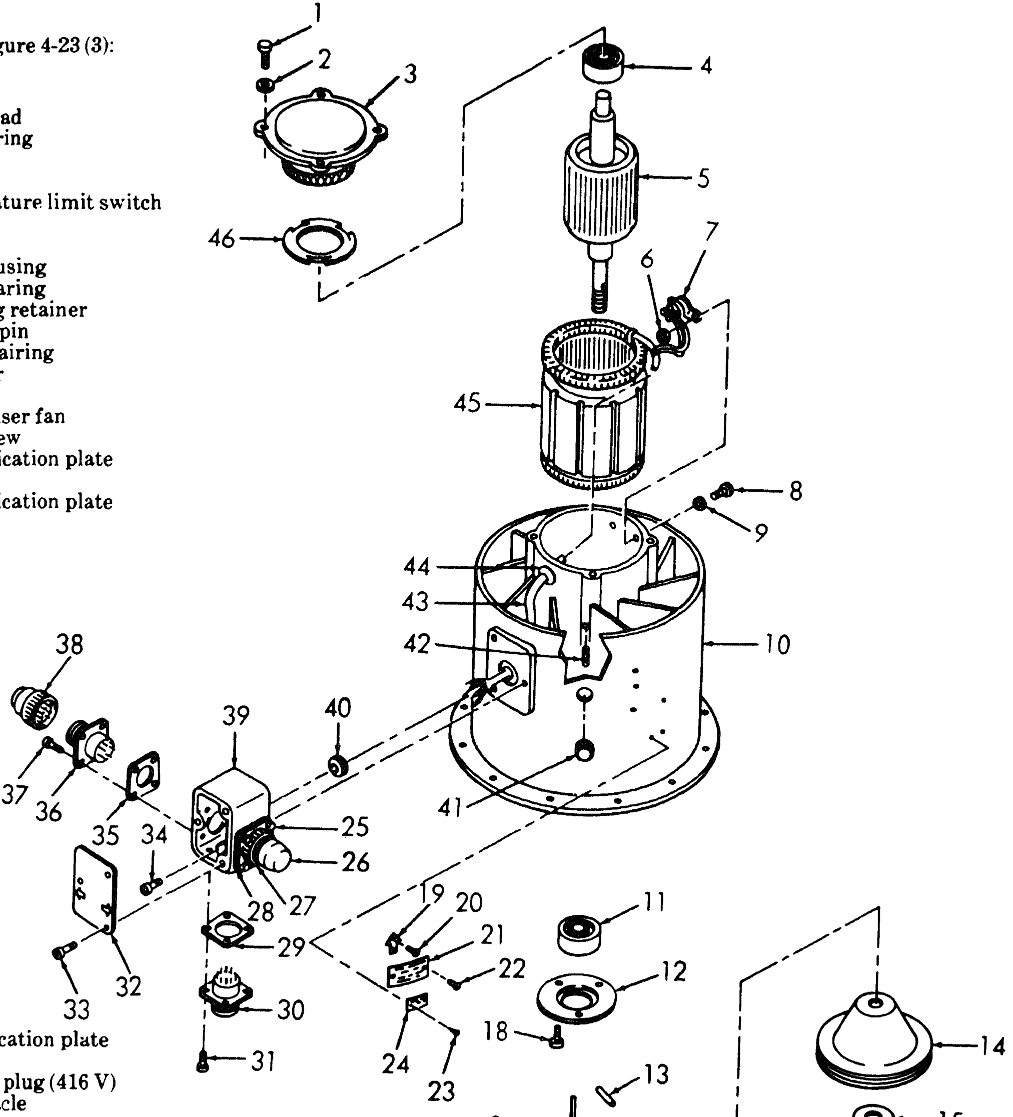
Page 4-41. Figure 4-23 (1) is supe



KEY to figur

1 Screw
2 Washer
3 Front head
4 Fan motor

Page 4-44. Figure 4-23 (3) is superseded.



KEY to figure 4-23 (3):
1 Screw
2 Washer
3 Front head
4 Ball bearing
5 Rotor
6 Nut
7 Temperature limit switch
8 Screw
9 Washer
10 Fan housing
11 Ball bearing
12 Bearing retainer
13 Spring pin
14 Rotor fairing
15 Washer
16 Nut
17 Condenser fan
18 Capscrew
19 Identification plate
20 Screw
21 Identification plate
22 Screw
23 Screw
24 Identification plate
25 Screw
26 Jumper plug (416 V)
27 Receptacle

Page B-1. Appendix B is s
lows:

B-1. Scope

This appendix lists items whic
Air Conditioner or are require
operation, or operator's maintena

B-2. General

This Basic Issue Items List is
following sections:

a. Basic Issue Items—Section
which accompany the Air Con
required by the operator/crew
operation, or maintenance.

b. Maintenance and Operating
tion III. Not applicable.

B-3. Explanation of Colum

The following provides an expla
in the tabular list of Basic Iss
II.

a. Source, Maintenance, an
Codes (SMR):

(1) *Source code.* Indicates t
listed item. Source codes are:

Code	*Explanation*
P . . .	Repair parts which are stocked i GSA/DSA, or Army supply s for use at indicated maintenanc

f. Quantity Furnished With Equipment. This lumn indicates the quantity of an item furnished with the equipment.

g. Illustration. Not applicable.

Section II. BASIC ISSUE ITEMS

(1) SMR code	(2) Federal stock No.	(3) Description Ref No. & Mfr code	(3) Description Usable on code	(4) Unit of meas	(5) Qty inc in unit	(6) Qty furn with equip	(7) Illustration (A) Fig. No.	(7) Illustration (B) Item No.
PC	7510-889-3494	BINDER, LOOSELEAF		EA	1	1		
PC	7520-559-9618	CASE, OPERATOR AND MAINTENANCE PUBLICATIONS		EA	1	1		
		ARMY TECHNICAL MANUAL, TM 5-4120-210-15		EA	1	1		
PO	4130-860-0042	OIL FILTER, WATER SOLUBLE		EA	1	1		

Page C-3. Group 40, line 2, delete "Motor compressor" and delete "D" in columns G, H, and I.

Page C-4. Group 52, line 1, "Gas compressor asbly" is changed to read "Motor compressor embly".

Page C-5. Section III, Reference code "A-H" is nged to read "A-G".

ection III, Remarks. "Repair motor only" is erseded as follows:

Replace motor compressor assembly after 4000 rs of operation. The motor compressor will be repaired and/or overhauled every 4000 hours b designated depots only. Report to USAMECOM for disposition. Seal all open ports of compresso being replaced immediately after removal fron air conditioner. Use sealing plugs (2), cap, anc plate removed from compressor being installed Preformed packing (O-ring) on discharge anc suction ports of replaced compressor will be usec with cap and plate above. Fill out and attach DA Form 2420, Exchange Tag, to motor compresso assembly.

By Order of the Secretary of the Army:

W C WESTMORELAND

ECHNICAL MANUAL
O. 5-4120-210-15

OPERAT
GENERAL S

AIR CONDITIO
8 HP, AC, 3 P
(FAIRCHI
4120-690-78
STRATOS MOD
38,000 BTU,
VEA4-3-10210
208 VOLT (FAI
FSN 4120-722-
STRATOS MODEL

HAPTER 1. INTRODUCTION
Section I. General ---------------
II. Description and tabulate
HAPTER 2. INSTALLATION AND
Section I. Service upon receipt of e
II. Movement to a new wo
III. Controls and instrument
IV. Operation of equipment
HAPTER 3. OPERATOR AND ORG INSTRUCTIONS
Section I. Operator and organizati
II. Preventive maintenance
III. Operator's maintenance
IV. Troubleshooting ------
V. Field expedient repairs
VI. Housing panels ------
VII. Air circulation system
VIII. Electrical system ------
HAPTER 4. DIRECT AND GENER

1–1. Scope

a. These instructions are pu
by personnel to whom the Fairc
conditioners (Models VEA
102103, VEA4–3–102103MO
28029, and VEA4–3–28029MC
Chapters 1 through 3 provide
operation, preventive mainte
and organizational maintenanc
accessories, components, anc
Chapter 4 provides informat
and general support and depo
Also included are descript
units and their functions in rela
er components.

b. Appendix A contains a
tions applicable to this manu
contains the list of basic issue i
the operator of this equipmen
contains the maintenance a
Organizational, direct suppor
port, and depot maintenance r

control (Model VEA4-3-28029), modified manual remote control (Model VEA4-3-28029MOD), externally mounted control panel for automatic operation (Model VEA4-3-102103) or modified automatic operating externally mounted control panel (Model VEA4-3-102103MOD). All models are rated at 35,-800 btu (British termal units) in heating capacity. Models VEA4-3, VEA4-3-102103, and VEA4-3-102103MOD are rated at 38,000 btu-cooling capacity. Models VEA4-3-28029 and VEA4-3-28029MOD are rated at 50,000-btu cooling capacity. The main components of the air circulation system are the vaporator fan assembly (figs. 1-10 and 1-11) and condenser fan assembly (figs. 1-7, 1-8, and 1-9). The compressor is driven by an integral induction-type motor.

b. Evaporator Section (Models VEA4-3, VEA4-3-28029 and VEA4-3-28029MOD). The evaporator section (fig. 1-5) contains the evaporator (fig. 1-10), evaporator fan, expansion valve, return air filter, filter drier, solenoid valve, sight gage window, heating unit, and electrical and temperature controls. Air circulating in the evaporator section is [illegible] ough the evaporator where the temperature of the air is lowered by heat extrac- [illegible] distributes the air into the space to be conditioned. Ventilation without cooling (Model VEA4-3 only), is supplied by a fresh-air inlet with manual control. Heating is provided by air circulated through the heating elements and distributed by the evaporator fan.

c. Evaporator Section (Models VEA4-

(figs. 1-10 and 1-11), sub-cooler, motor compressor, oil separator, condenser fan, and high-pressure refrigerant controls. Air drawn through condenser cools refrigerant and carries off heat present in compressor area. The warm air is exhausted through condenser air duct located on top of condenser section.

e. Power Requirements.

(1) Model VEA4-3 requires a power source of 416-volt, ac, 3-phase, 400 cycle, 4-wire electric power.

(2) Remaining models require 208-volt ac, 3-phase, 400-cycle, 4-wire electric power.

(3) All models require 15 kilowatt (kw) minimum output of power.

1-4. Identification and Tabulated Data

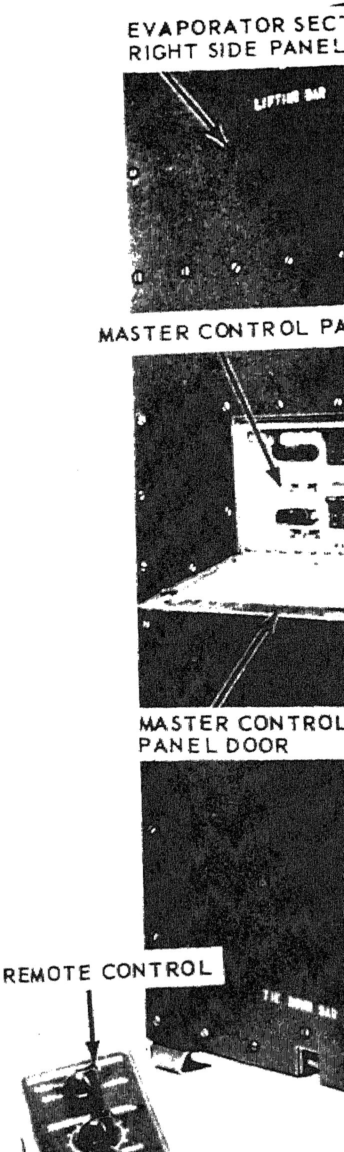
a. Identification. The air conditioners have six major identification plates.

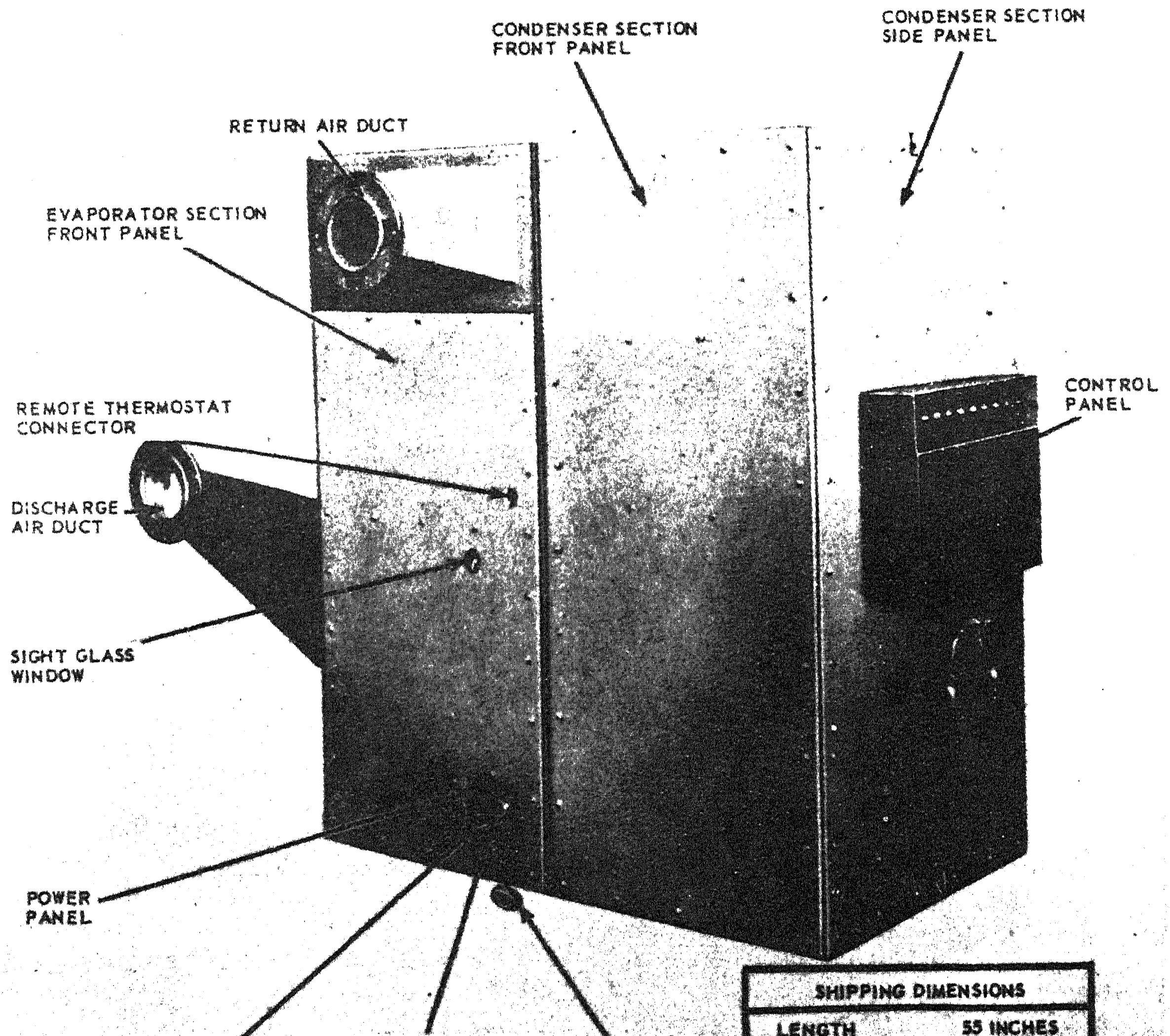
(1) *Compressor motor plate.* Located on top of motor frame. Specifies manufacturer, model and serial numbers and contract number.

(2) *Compressor plate.* Located on upper face of compressor. Specifies manufacturer, serial number, and part number.

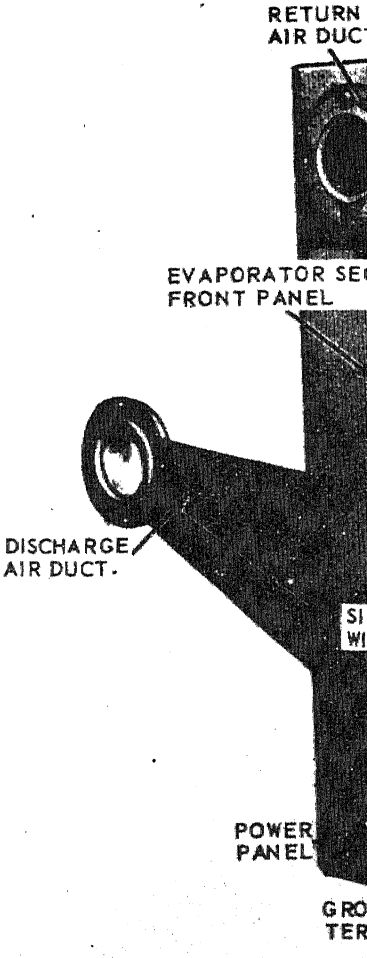
(3) *Condenser plate.* Located on left side of unit. Specifies make, model, serial and part numbers.

(4) *Evaporator plate.* Located on side (Models VEA4-3, VEA4-3-8029

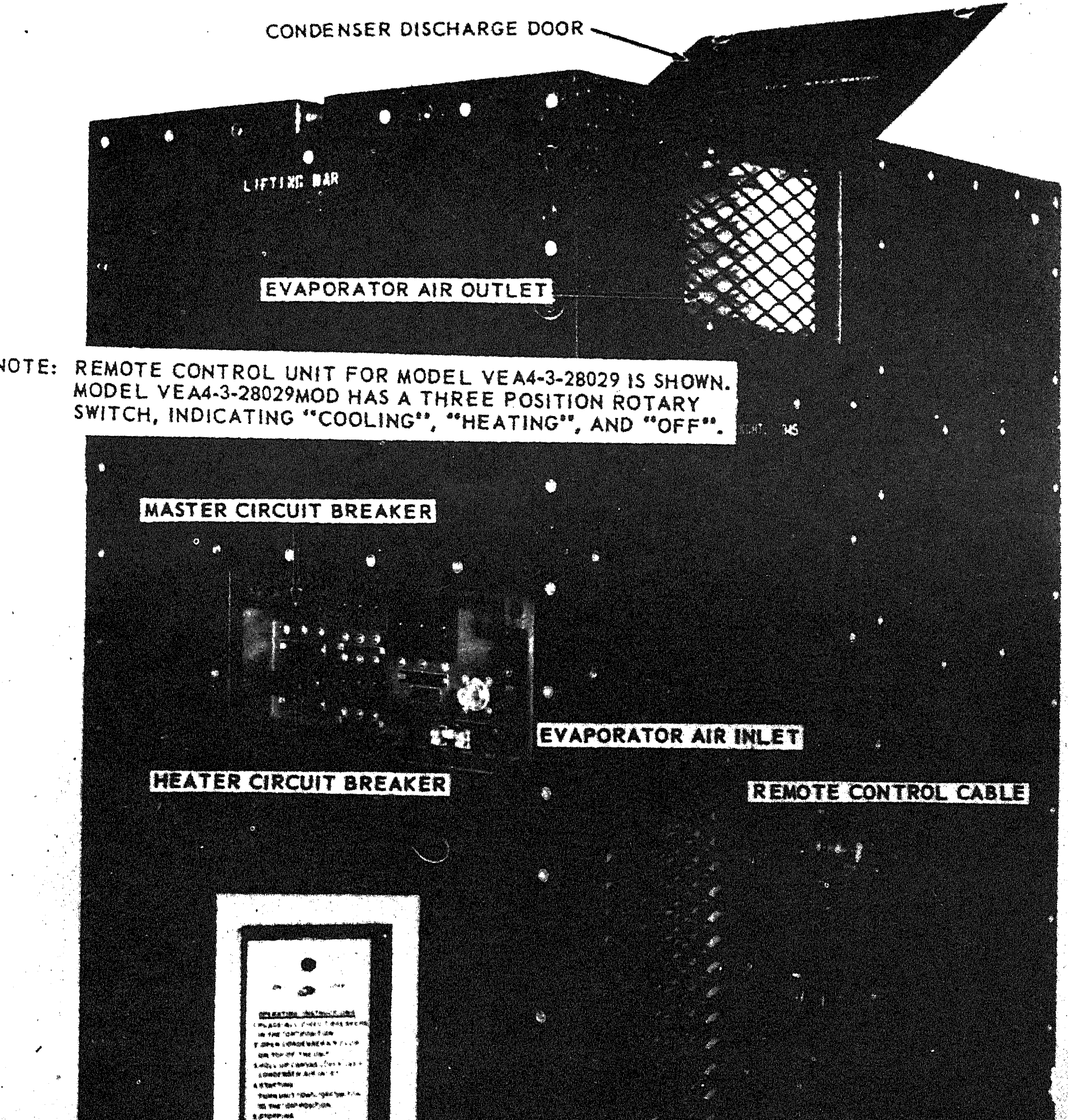



CONDENSER SECTION FRONT PANEL
CONDENSER SECTION SIDE PANEL
RETURN AIR DUCT
EVAPORATOR SECTION FRONT PANEL
REMOTE THERMOSTAT CONNECTOR
DISCHARGE AIR DUCT
SIGHT GLASS WINDOW
POWER PANEL
CONTROL PANEL

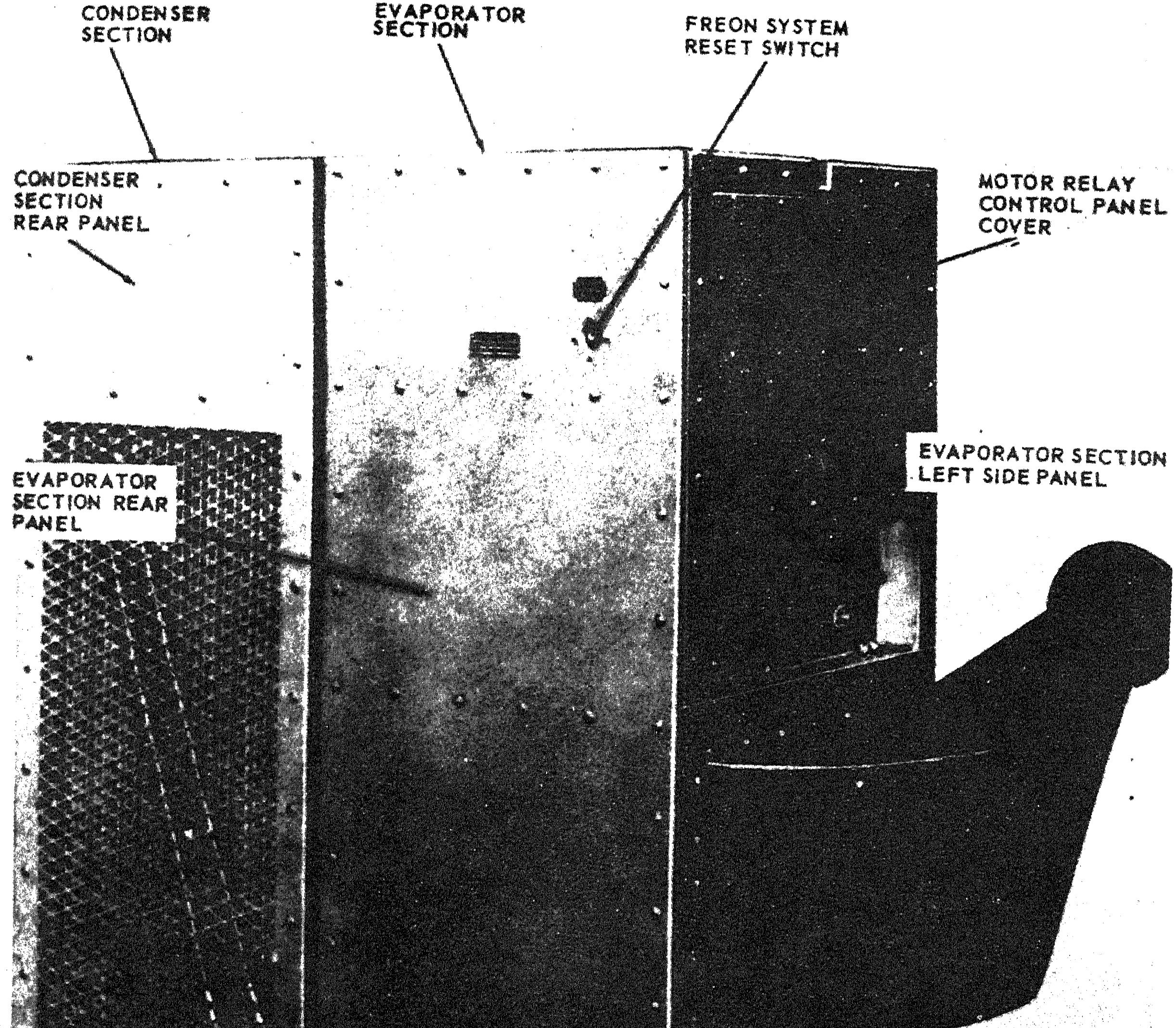
SHIPPING DIMENSIONS	
LENGTH	55 INCHES

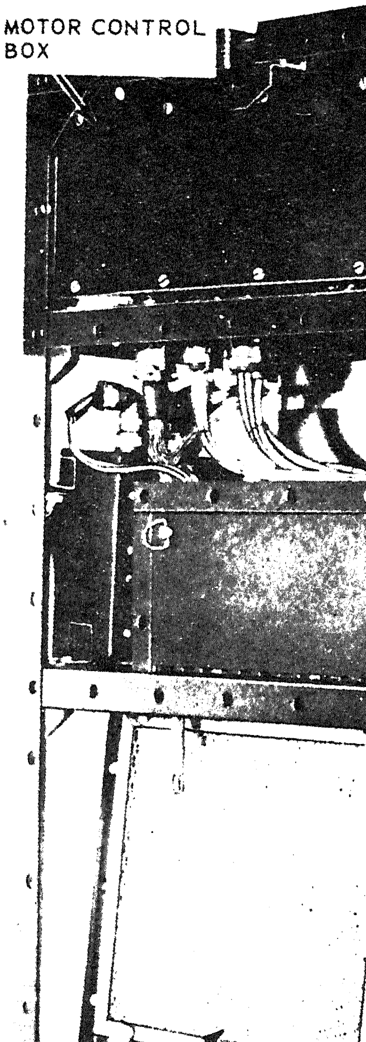


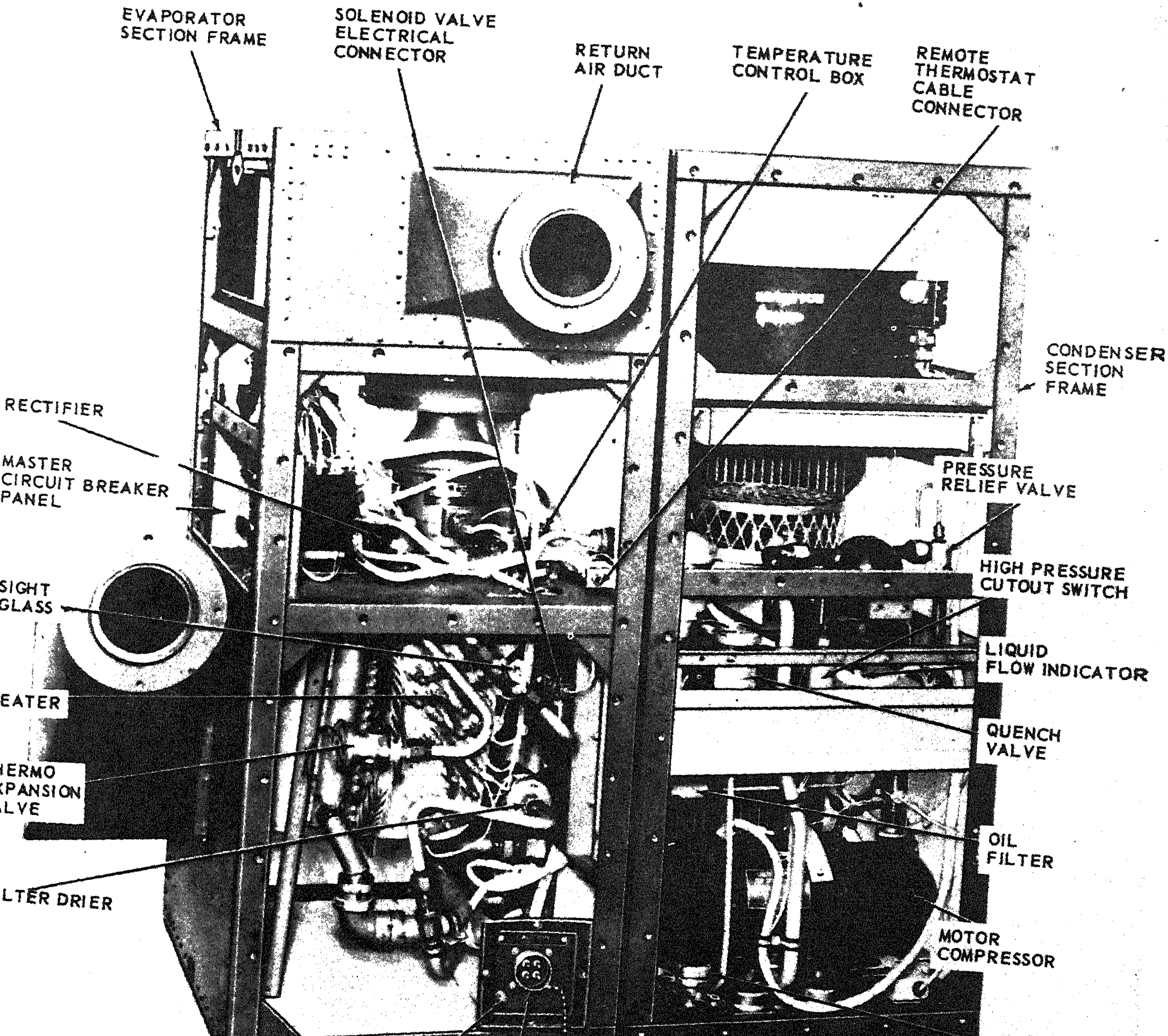
SHIPPING DIM

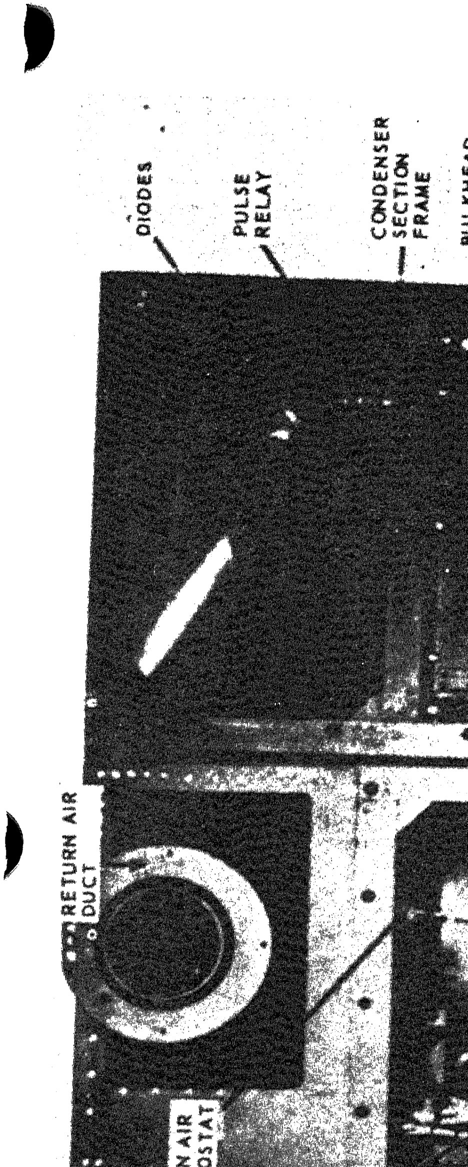


NOTE: REMOTE CONTROL UNIT FOR MODEL VEA4-3-28029 IS SHOWN. MODEL VEA4-3-28029MOD HAS A THREE POSITION ROTARY SWITCH, INDICATING "COOLING", "HEATING", AND "OFF".


CONDENSER SECTION
EVAPORATOR SECTION
FREON SYSTEM RESET SWITCH
CONDENSER SECTION REAR PANEL
MOTOR RELAY CONTROL PANEL COVER
EVAPORATOR SECTION LEFT SIDE PANEL
EVAPORATOR SECTION REAR PANEL


MOTOR CONTROL BOX


EVAPORATOR SECTION FRAME
SOLENOID VALVE ELECTRICAL CONNECTOR
RETURN AIR DUCT
TEMPERATURE CONTROL BOX
REMOTE THERMOSTAT CABLE CONNECTOR
CONDENSER SECTION FRAME
RECTIFIER
MASTER CIRCUIT BREAKER PANEL
PRESSURE RELIEF VALVE
HIGH PRESSURE CUTOUT SWITCH
SIGHT GLASS
LIQUID FLOW INDICATOR
EATER
QUENCH VALVE
HERMO
KPANSION
ALVE
OIL FILTER
LTER DRIER
MOTOR COMPRESSOR


DIODES
PULSE RELAY
CONDENSER SECTION FRAME
RETURN AIR DUCT
N AIR
OSTAT

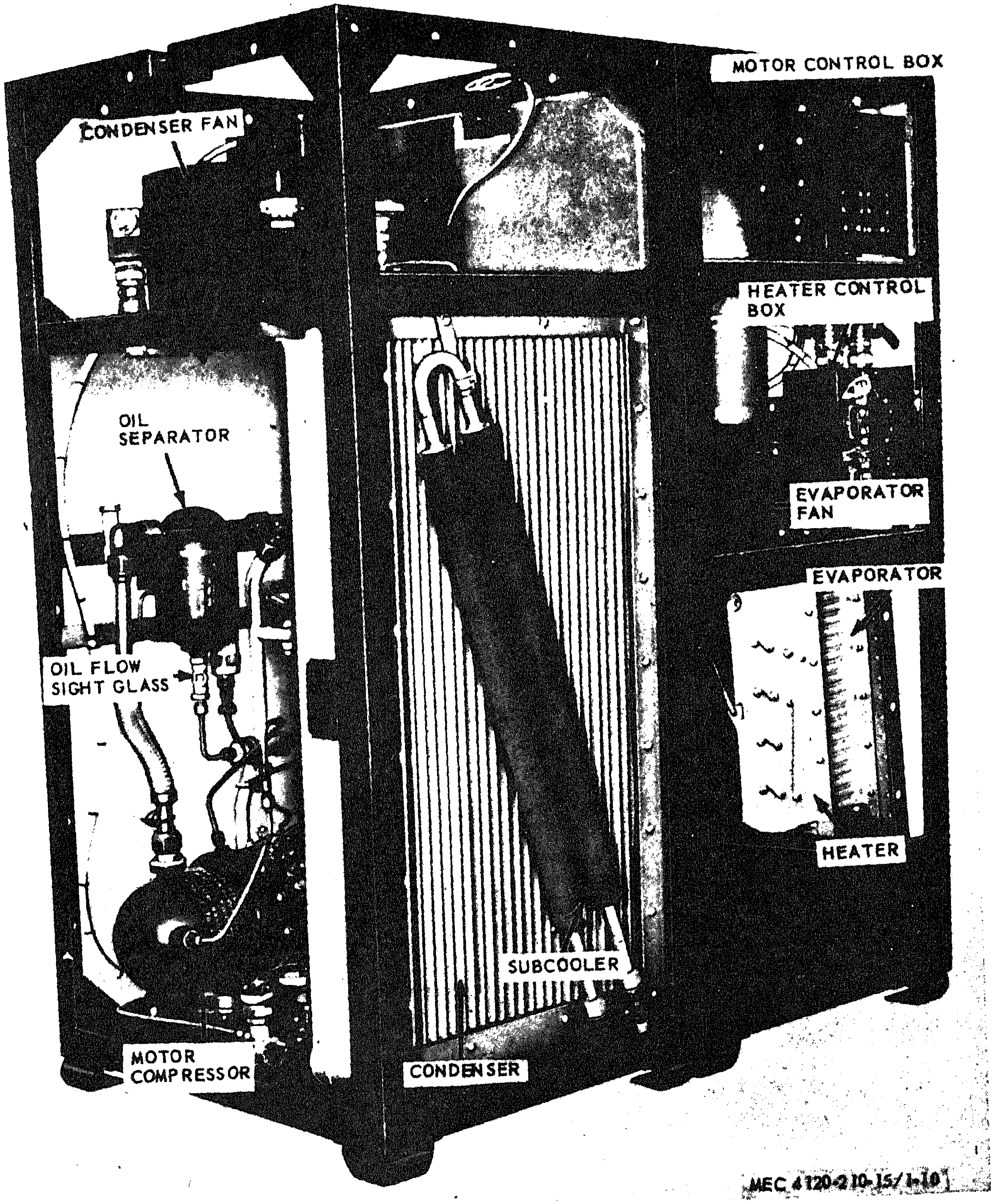
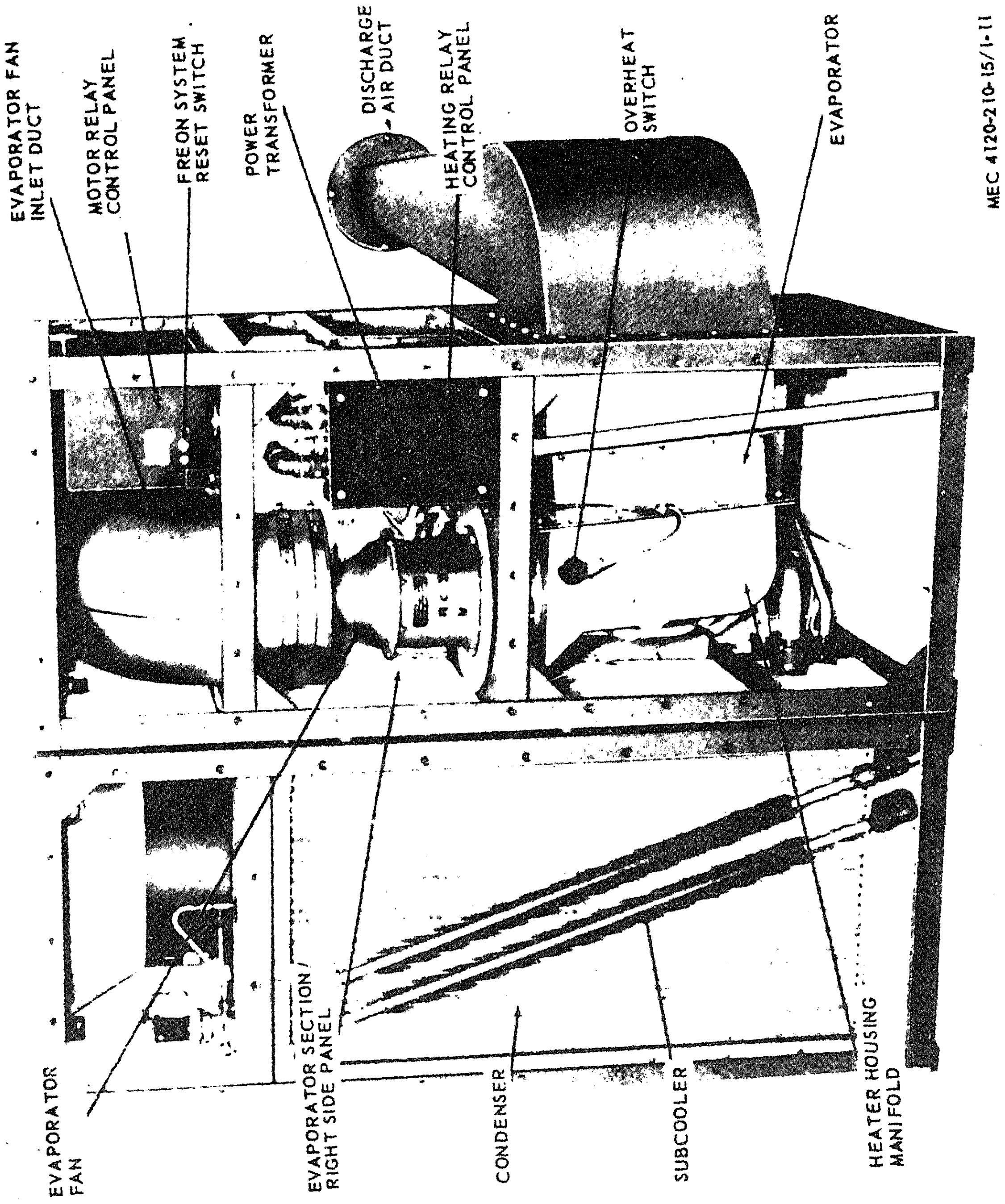


Figure 1–10. Air Conditioner, three-quarter, right rear with panels removed (Models VEA4–3, VEA4–3–28029 and VEA4–3–28029MOD).


EVAPORATOR FAN INLET DUCT
MOTOR RELAY CONTROL PANEL
FREON SYSTEM RESET SWITCH
POWER TRANSFORMER
DISCHARGE AIR DUCT
HEATING RELAY CONTROL PANEL
OVERHEAT SWITCH
EVAPORATOR
EVAPORATOR FAN
EVAPORATOR SECTION RIGHT SIDE PANEL
CONDENSER
SUBCOOLER
HEATER HOUSING MANIFOLD
MEC 4120-210-15/1-11

1–11. Air Conditioner, rear view with panels removed (Models VEA4–3–10210S and VEA4–3–10210SMOD).

(e) Condenser fan motor.

anufacturer	Pesco Products Division of Borg-Warner Corp.
odel	189137-011-01
ltage	208/416
requency	400 cps
iase	3
eed	5,400 rpm
ıpacity	4,100 cfm

(f) Solenoid valve.

anufacturer	Alco Valve Co
pe	S804-4
ltage	24 volts direct current (vdc)

(g) Dimensions and weight.

eight	350 pounds (lb)
ngth	40 1/2 inches (in.)
idth	24 in.
ight	49 1/2 in.

(2) *Models VEA4-3-102103 and VEA-4-3-102103MOD.*

(a) Air conditioner.

pe	Vapor compression
ating	Electric
frigerant	12
tput:	
Cooling stage	28,000 btu
Heating stage	38,500 btu
erating voltage	208

(b) Compressor.

nufacturer	Stratos Division of Fairchild Engine and Airplane Corp.
del	FCR4-3
ɔe	Heli-rotor

(c) Compressor motor.

nufacturer	General Electric Co.
del	5K31NJ4T
rsepower	8.0
tage	208
quency	400 cps
se	3
ed	7,600 rpm

(d) Evaporator fan motor.

ıufacturer	Joy Manufacturing Co.
lel	ARM40-30D-1909
age	208
quency	400 cps
se	3
ed	22,900 rpm
acity	300 cfm at 40 pounds per square inch (PSI).

(e) Condenser fan motor.

ıfacturer	Pesco Products Division of Borg-Warner Corp.
el	189137-011-01
age	208/416
ɪuency	400 cps
se	3
d	5,400 rpm
Capacity	4,100 cfm

(f) Solenoid valve.

Manufacturer	Alco Valve Co.
Type:	
Model 102103	S804-4
Model 102103MOD	S804-4MOD
Voltage	24 v dc

(g) Dimensions and weight.

Weight	375 lb
Length	55 in.
Width	32 in.
Height	48 in.

(3) *Models VEA4-3-28029 and VEA4-3-28029MOD.*

(a) Air conditioner.

Type	Vapor compression
Heating	Electric
Refrigerant	12
Output:	
Cooling stage	50,000 btu
Heating stage	38,500 btu
Operating voltage	208

(b) Compressor.

Manufacturer	Stratos Division of Fairchild Engine and Airplane Co.
Model	FCR4-3
Type	Heli-rotor

(c) Compressor motor.

Manufacturer	U.S. Electrical Motors, Inc of Los Angeles
Model	407340
Horsepower	13
Voltage	208
Frequency	400 cps
Phase	3
Speed	11,500 rpm

(d) Evaporator fan motor.

Manufacturer	Pesco Products Division of Borg-Warner Corp.
Model	189087-011-02
Voltage	208/416
Frequency	400 cps
Phase	3
Speed	5,400 rpm
Capacity	1,200 cfm

(e) Condenser fan motor.

Manufacturer	Pesco Products Division of Borge-Warner Corp.
Model	189137-011-01
Voltage	208/416
Frequency	400 cps
Phase	3
Speed	5,400 rpm
Cpacity	4,100 cfm

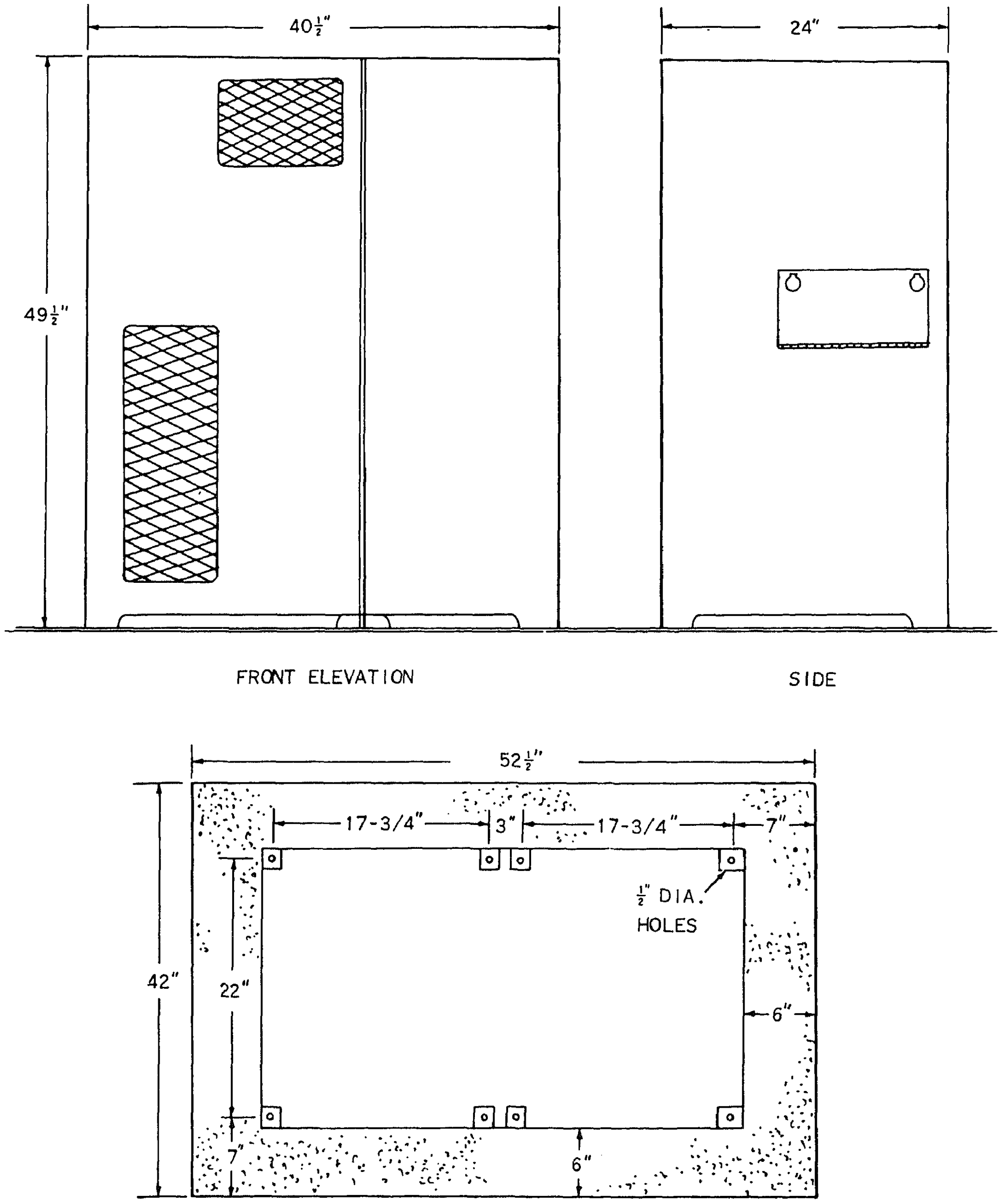
(f) Solenoid valve.

Manufacturer	Alco Valve Co.
Type	S804-4
Voltage	24 v dc

(g) Dimensions and weight.

Weight	350 lb
Length	40 1/2 in.
Width	24 in.
Height	49 1/2 in.

c. Base Plan (Fig. 1-12).

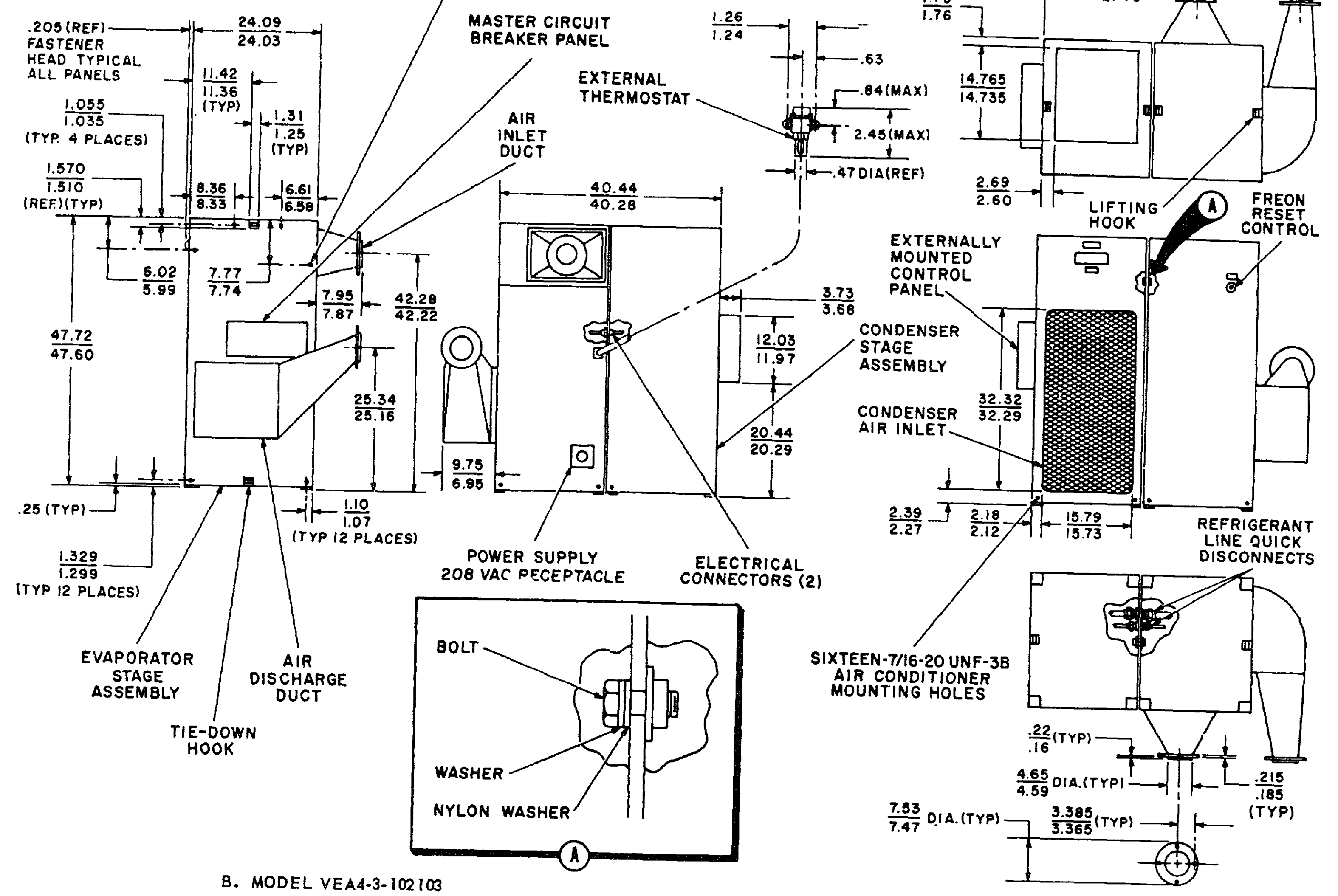


A. MODELS VEA4-3, VEA4-3-28029, AND VEA4-3-28029MOD.

MEC 4120-210-15/1-12 ①

Models VEA4-3, VEA4-3-28029 and VEA4-3-28029MOD

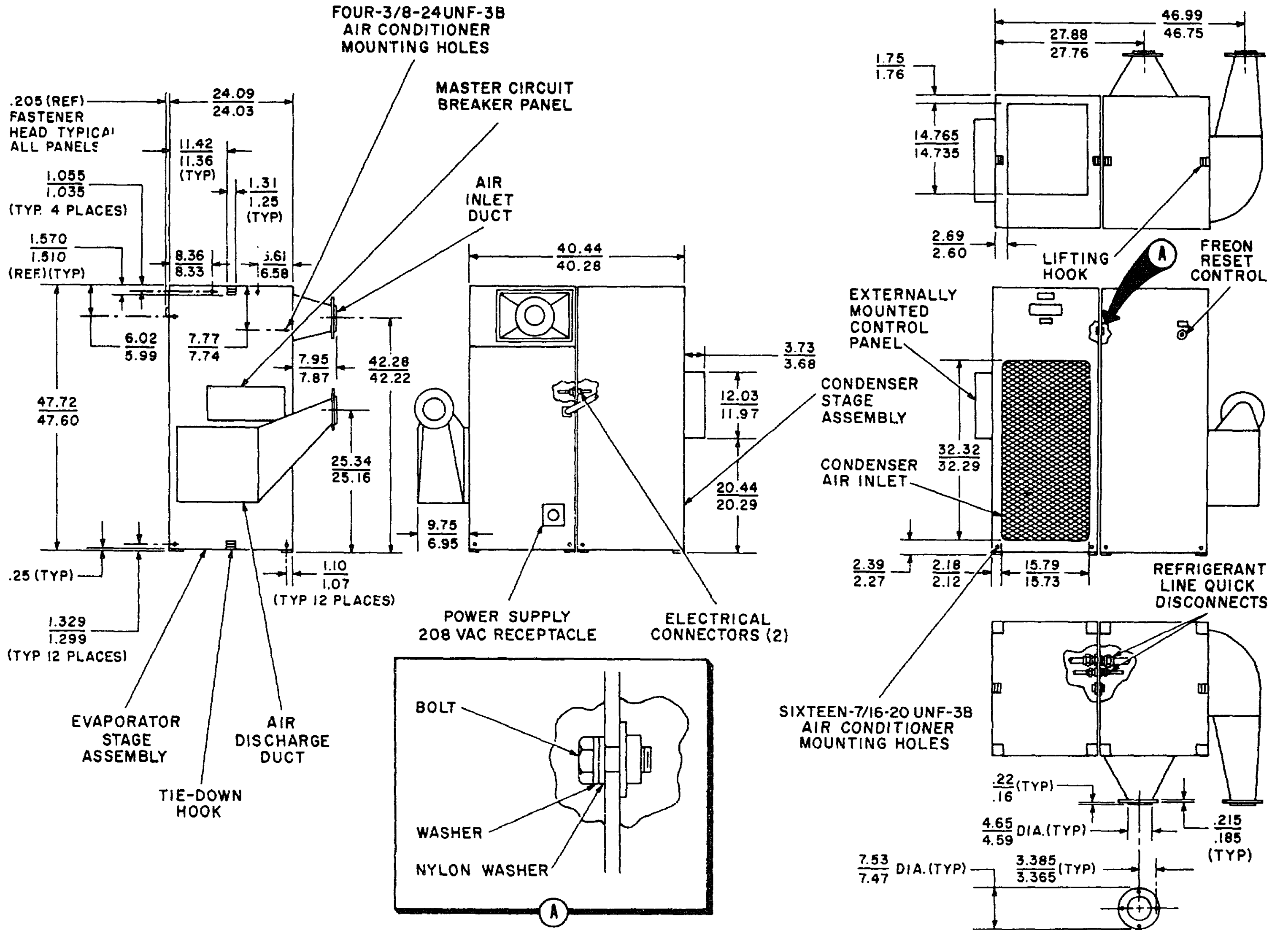
Figure 1-12. Base plan.



B. MODEL VEA4-3-102103

MEC 4120-210-15/1-12 ②

Model VEA4-3-102103
Figure 1-12—Continued.



C. MODEL VEA4-3-102103MOD.

MEC 4120-210-15/1-12 ③

Model VEA4-3-102103MOD
Figure 1-12—Continued.

1–5. Difference in Models

This manual covers the Fairchild Stratos Models VEA4–3, VEA4–3–102103, VEA4–3–102103MOD, VEA4–3–28029, and VEA4–3–28029MOD Air Conditioners. The difference in the models are in the compressor, evaporator fan, condenser fan motor, power requirements, controls, and ductwork adapters. Where differences exist, each model is covered separately in the applicable maintenanc section of this manual. VEA4–3–28029 utilize a compressor motor of greater horsepower an different make than other models, and a mod ified remote control panel. VEA4–3–2802 MOD modifies control system used on VEA4 3–28029. VEA4–3–102103MOD modifies con trol system used on VEA4–3–102103. VEA4– operates on 416-volt power. Remaining unit operate on 208-volt power.

CHAPTER 2

INSTALLATION AND OPERATION INSTRUCTION

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

2–1. Unloading Equipment

Use a forklift or hoisting device to lift the air conditioner from the carrier.

Caution: **Exercise care in unloading operations to avoid damaging the air conditioner and separately packed components.**

2–2. Unpacking Equipment

a. Cut the metal straps and uncrate the air conditioner.

b. Carefully remove the two layers of barrier paper.

c. Unbolt and remove the wooden shipping base.

d. Open the separate shipping carton and unpack the remote control box and wiring harness (Models VEA4–3, VEA4–3–28029, and VEA4–3–28029MOD).

e. Prepare unit for inspection and operation as outlined in DA Form 2258.

2–3. Inspecting and Servicing Equipment

a. Perform the preventive maintenance services (para 3–4).

b. Remove the housing panels (para 3–23).

c. Examine the air filter (Models VEA4–3, VEA4–3–28029, and VEA4–3–28029MOD) and the evaporator for dirt, dust, or other obstructions.

d. Inspect the selector knobs of remote control box for proper operation (Models VEA4–3, and VEA4–3–28029MOD only).

e. Examine the condenser fan door for serviceability (Models VEA4–3, VEA4–3–28029, and VEA4–3–28029MOD only).

f. Open the master circuit breaker con panel door and examine circuit breakers proper operation. Make certain that there i fuse in the fuseholder.

g. Examine the compressor area for indi tions of oil or refrigerant leaks.

h. Correct all deficiencies or report to di support maintenance.

2–4. Installation of Separately Packed Components (Models VAE4–3–28029, and VEA4 3 28029MOD)

a. Examine the remote control cable for p sible defects.

b. Connect either end of the remote con cable to the remote control assembly and c nect the other end to the remote control ceptacle (fig. 1–1) on the air conditione

c. Mount the remote control box on a or panel at a convenient height for operat

2–5. Installation and Setting-Up Instructions

a. General. Inspect area to be conditio for a site that will utilize existing ductwork a suitable base is not available, build one accordance with the base plan (fig. 1–12) secure unit to the existing floor slab.

Note. Detailed instructions are not provided this manual due to conditions which may vary at w site. Steps described below are minimum installa requirements for efficient operation of the air co tioners. Adaptations should be made to conform ductwork existing at the site.

b. Models VEA4-3, VEA4-3-28029, and VEA4-3-28029MOD.

(1) Open condenser fan door (fig. 2-1) and position the unit so that fan grille is directly beneath an exhaust duct vented to the outside.

(2) Provide a fresh air inlet in line with the fresh air door (fig. 1-5).

c. Models VEA4-3-102103 and VEA4-3-102103MOD.

(1) Position the air conditioner so that condenser fan discharge, condenser cooling-air inlet, evaporator fan dis-discharge, evaporator cooling-air inlet, and fresh air inlet have unobstructed air flow.

Note. To insure proper operation, an airtight seal must be maintained between external ducting, if used; and the air conditioners. Make certain this ducting and the air conditioner are properly alined.

(2) Mount external thermostat on a wall or panel in the compartment to be conditioned (Model VEA4-3-102103 only).

(3) Connect external thermostat cable to remote control cable receptacle on the evaporator stage front panel (Model VEA4-3-102103 only).

(4) Remove the plastic shipping plug from pressure relief valve.

(5) Ground the air conditioner by connecting a ground wire to the grounding terminal (fig. 1-8).

***Caution:* Be certain proper power of the correct phase is available (para 1-3e) before connecting the main power cable to the main powe supply electrical connector.**

***Warning:* Before connecting power, all switches and circuit breaker must be in the OFF position.**

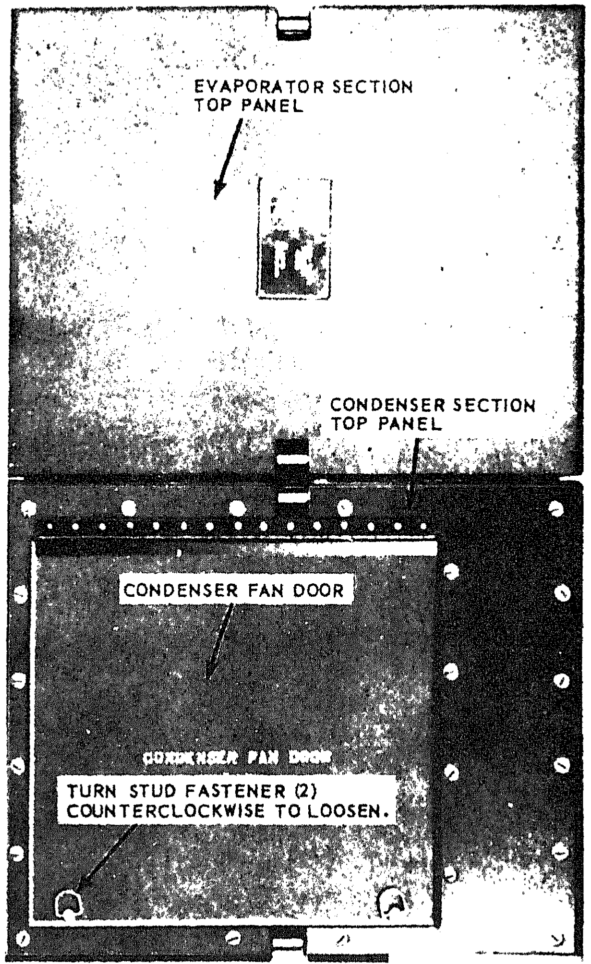

EVAPORATOR SECTION TOP PANEL
CONDENSER SECTION TOP PANEL
CONDENSER FAN DOOR
CONDENSER FAN DOOR
TURN STUD FASTENER (2) COUNTERCLOCKWISE TO LOOSEN.
MEC 4120-210-15/2-1

Figure 2-1. Condenser fan door (Models VEA4-3, VEA-4-3-28029, and VEA4-3-28029MOD).

Section II. MOVEMENT TO A NEW WORKSITE

2-6. Dismantling for Movement

a. Models VEA4-3, VEA4-3-28029, and VEA4-3-28029MOD.

(1) Disconnect main power cable.

(2) Pull master circuit breaker outward.

(3) Place selector knobs on remote control box in OFF position and disconnect remote control wiring harnes from air conditioner receptacle.

(4) Remove remote control box from wal or panel mounting.

(5) Close and secure condenser fan door and control panel door.

(6) Release unit from base or floor slab and move to new worksite.

b. Models VEA4-3-102103 and VEA4-3-102103MOD.

(1) Pull master circuit breaker outward.

(2) Set all switches and circuit breakers to OFF position.

(3) Turn off main supply and disconnect main power cable.

(4) Close and secure the externally mounted control panel.

(5) Remove external thermostat from its mounting (Model VEA4-3-102103 only).

(3) Release unit from its mounting.

2-7. Reinstallation After Movement

For reinstallation of the air conditioners at new worksites, follow the procedures outlined in paragraph 2-5.

Section III. CONTROLS AND INSTRUMENTS

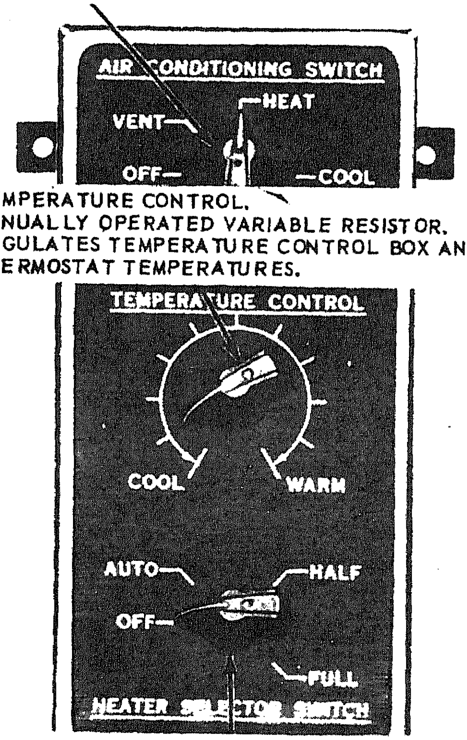
2-8. General

This section describes, locates, illustrates, and furnishes the operator, crew, or organizational maintenance personnel sufficient information pertaining to the various controls and instruments provided for the proper operation of the air conditioners.

2-9. Controls and Instruments

The purpose of the controls and instruments and their normal reading are illustrated in figure 2-2.

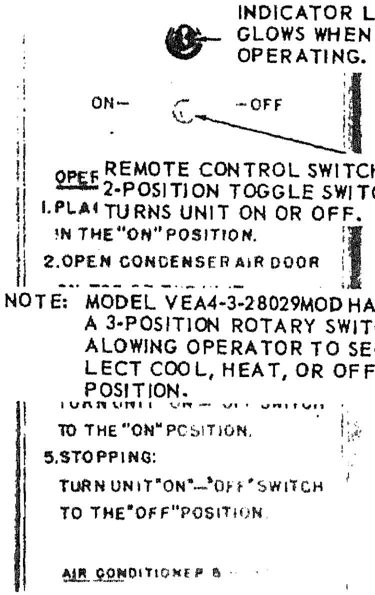
AIR CONDITIONING SWITCH. MANUALLY OPERATED, 4-POSITION ROTARY SWITCH. ENABLES SELECTION OF MODE OF OPERATION AND SHUTS DOWN UNIT WHEN IN OFF POSITION.



TEMPERATURE CONTROL. MANUALLY OPERATED VARIABLE RESISTOR. REGULATES TEMPERATURE CONTROL BOX AND THERMOSTAT TEMPERATURES.

HEATER SELECTOR SWITCH. MANUALLY OPERATED, 4-POSITION ROTARY SWITCH. CONTROLS MODE OF OPERATION WHEN UNIT IS IN HEATING CYCLE. IN AUTO POSITION, HEATER IS AUTOMATICALLY CONTROLLED BY THERMOSTAT. HALF POSITION UTILIZES HALF OF HEATER ELEMENTS. FULL POSITION USES ENTIRE HEATER BANK.

A. REMOTE CONTROL BOX. (MODEL VEA4-3).



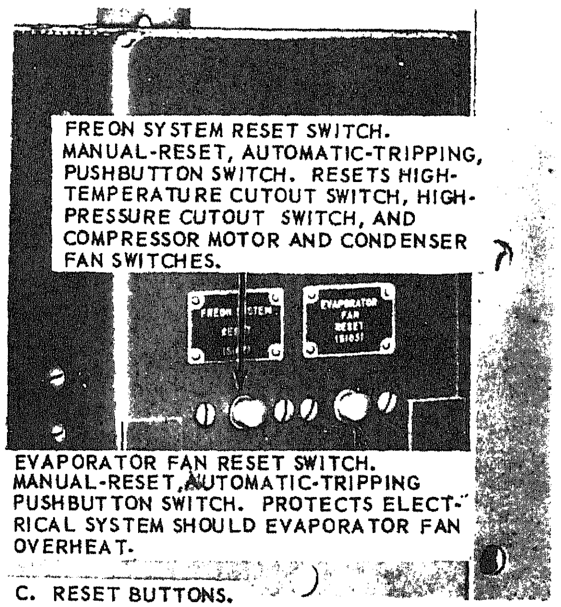
INDICATOR LIGHT. GLOWS WHEN UNIT IS OPERATING.

REMOTE CONTROL SWITCH. 2-POSITION TOGGLE SWITCH. TURNS UNIT ON OR OFF.

NOTE: MODEL VEA4-3-28029MOD HAS A 3-POSITION ROTARY SWITCH ALOWING OPERATOR TO SELECT COOL, HEAT, OR OFF POSITION.

B. REMOTE CONTROL BOX. (MODELS VEA4-3-28029 AND VEA4-3-28029MOD).

NOTE: MODEL VEA4-3-102103MOD DOES NOT HAVE EVAPORATOR FAN RESET SWITCH.



FREON SYSTEM RESET SWITCH. MANUAL-RESET, AUTOMATIC-TRIPPING, PUSHBUTTON SWITCH. RESETS HIGH-TEMPERATURE CUTOUT SWITCH, HIGH-PRESSURE CUTOUT SWITCH, AND COMPRESSOR MOTOR AND CONDENSER FAN SWITCHES.

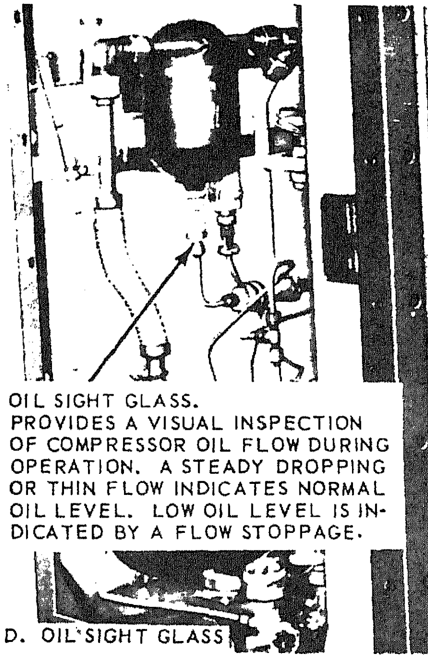
EVAPORATOR FAN RESET SWITCH. MANUAL-RESET, AUTOMATIC-TRIPPING PUSHBUTTON SWITCH. PROTECTS ELECTRICAL SYSTEM SHOULD EVAPORATOR FAN OVERHEAT.

C. RESET BUTTONS.

MEC 4120-210-15/2-2 ①

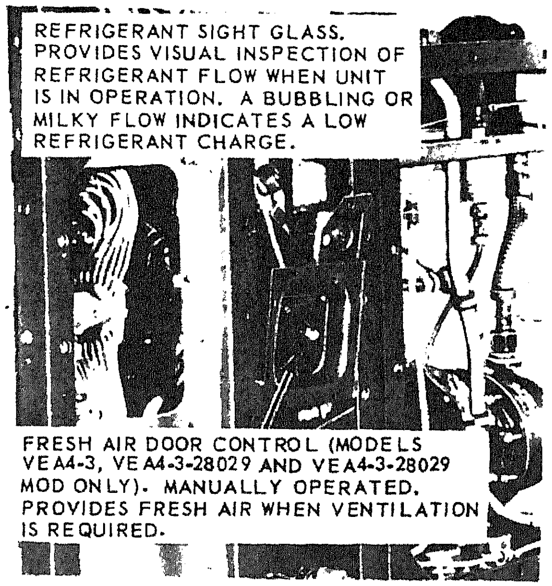
A through C

Figure 2-2. Controls and instruments.



OIL SIGHT GLASS. PROVIDES A VISUAL INSPECTION OF COMPRESSOR OIL FLOW DURING OPERATION. A STEADY DROPPING OR THIN FLOW INDICATES NORMAL OIL LEVEL. LOW OIL LEVEL IS INDICATED BY A FLOW STOPPAGE.

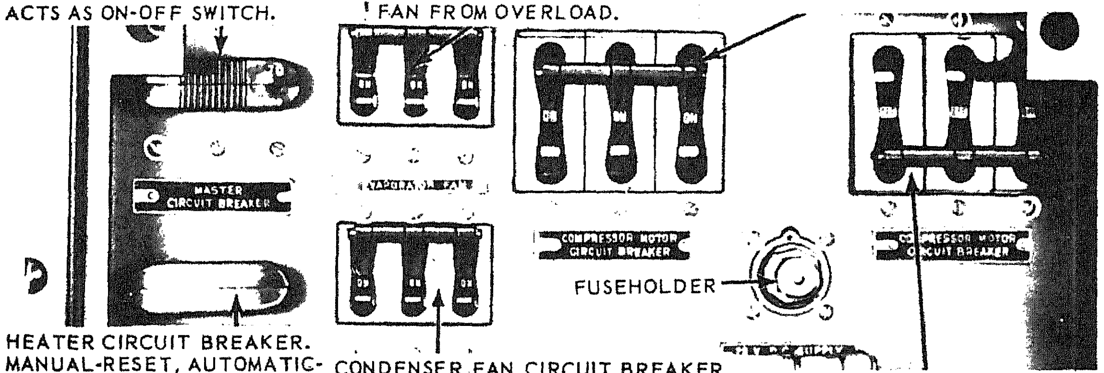
D. OIL SIGHT GLASS



REFRIGERANT SIGHT GLASS. PROVIDES VISUAL INSPECTION OF REFRIGERANT FLOW WHEN UNIT IS IN OPERATION. A BUBBLING OR MILKY FLOW INDICATES A LOW REFRIGERANT CHARGE.

FRESH AIR DOOR CONTROL (MODELS VEA4-3, VEA4-3-28029 AND VEA4-3-28029 MOD ONLY). MANUALLY OPERATED. PROVIDES FRESH AIR WHEN VENTILATION IS REQUIRED.

E. REFRIGERANT SIGHT GLASS AND FRESH AIR DOOR.


MASTER CIRCUIT BREAKER
EVAPORATOR FAN
COMPRESSOR MOTOR CIRCUIT BREAKER
COMPRESSOR MOTOR CIRCUIT BREAKER
FUSEHOLDER

MASTER CIRCUIT BREAKER MANUALLY OPERATED, PUSH-PULL THERMAL TYPE BREAKER. CONTROLS POWER TO UNIT AND ACTS AS ON-OFF SWITCH.

EVAPORATOR FAN CIRCUIT BREAKER. MANUAL-RESET, AUTOMATIC TRIPPING, THERMAL TYPE. PROTECTS EVAPORATOR FAN FROM OVERLOAD.

416 VOLT COMPRESSOR MOTOR CIRCUIT BREAKER. MANUAL-RESET, AUTOMATIC-TRIPPING THERMAL TYPE. PROTECTS COMPRESSOR MOTOR FROM OVERLOAD.

HEATER CIRCUIT BREAKER. MANUAL-RESET, AUTOMATIC-TRIPPING, THERMAL TYPE PROTECTS HEATER FROM OVERLOAD.

CONDENSER FAN CIRCUIT BREAKER. MANUAL-RESET, AUTOMATIC-TRIPPING, THERMAL TYPE. PROTECTS CONDENSER FAN FROM OVERLOAD.

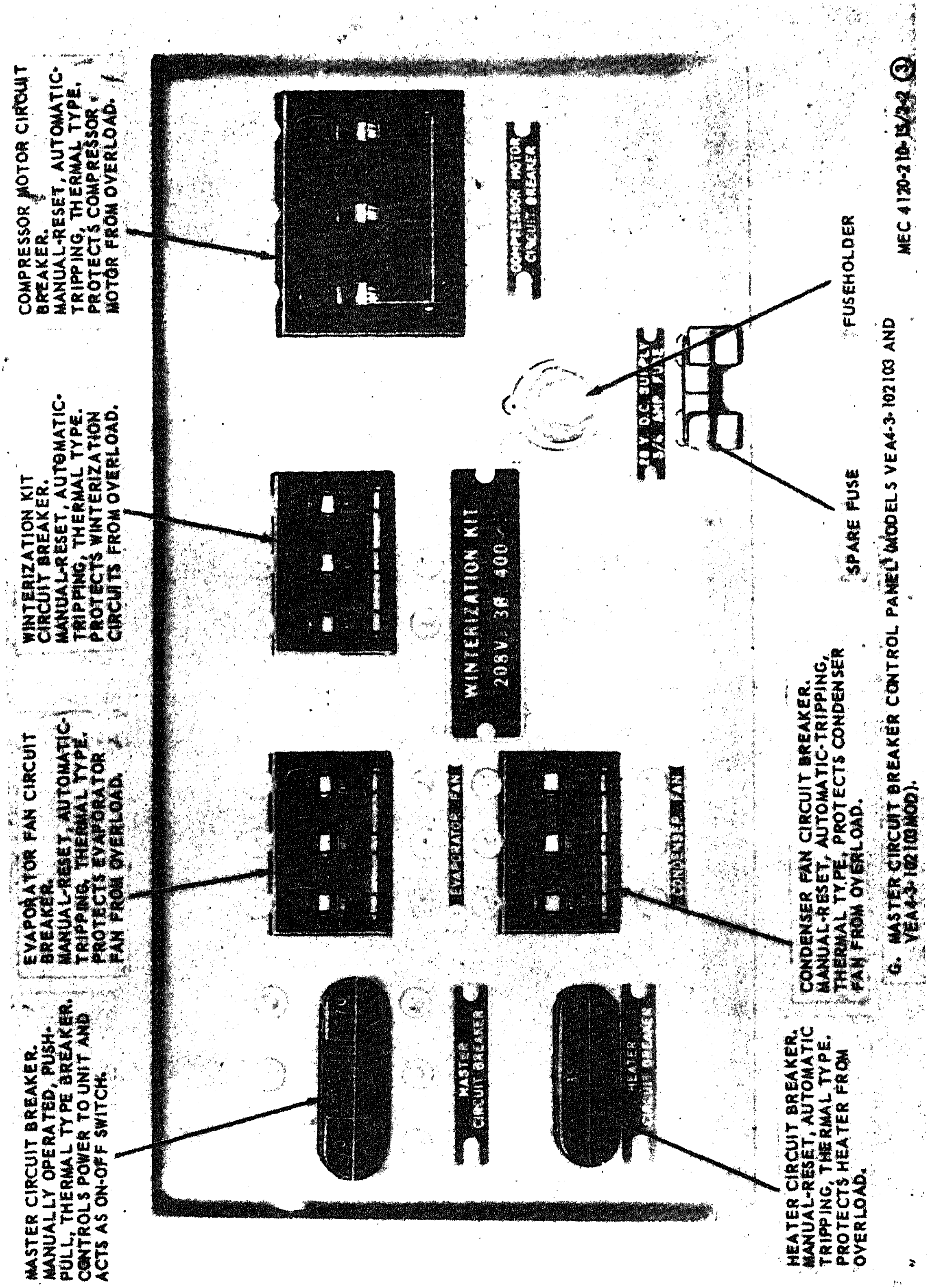
208 VOLT COMPRESSOR MOTOR CIRCUIT BREAKER. NOT CONNECTED FOR MODEL VEA4-3.

F. MASTER CIRCUIT BREAKER CONTROL PANEL (MODEL VEA4-3).

MEC 4120-210-15/2-2 ②

D through F

Figure 2-2—Continued.

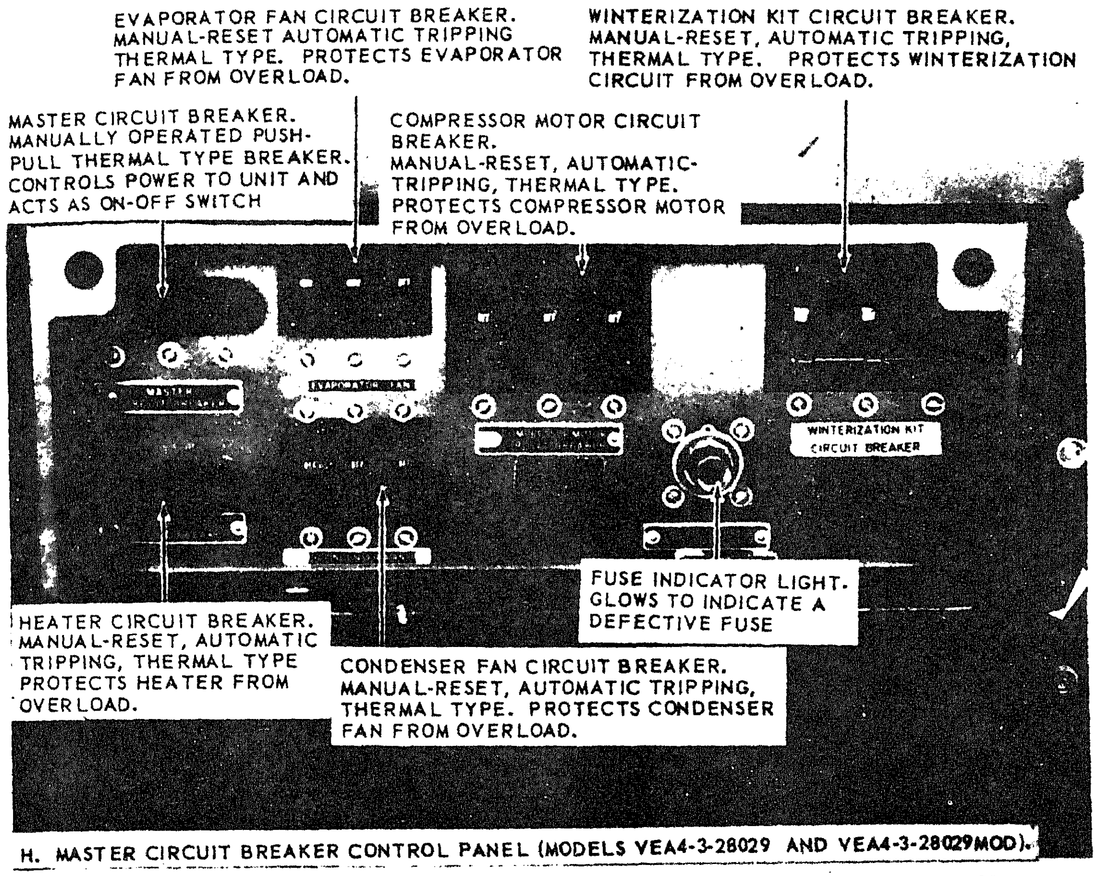

COMPRESSOR MOTOR CIRCUIT BREAKER. MANUAL-RESET, AUTOMATIC-TRIPPING, THERMAL TYPE, PROTECTS COMPRESSOR MOTOR FROM OVERLOAD.
WINTERIZATION KIT CIRCUIT BREAKER. MANUAL-RESET, AUTOMATIC-TRIPPING, THERMAL TYPE. PROTECTS WINTERIZATION CIRCUITS FROM OVERLOAD.
EVAPORATOR FAN CIRCUIT BREAKER. MANUAL-RESET, AUTOMATIC-TRIPPING, THERMAL TYPE. PROTECTS EVAPORATOR FAN FROM OVERLOAD.
MASTER CIRCUIT BREAKER. MANUALLY OPERATED, PUSH-PULL, THERMAL TYPE BREAKER. CONTROLS POWER TO UNIT AND ACTS AS ON-OFF SWITCH.
COMPRESSOR MOTOR CIRCUIT BREAKER
WINTERIZATION KIT
208V. 3Ø 400~
EVAPORATOR FAN
CONDENSER FAN
MASTER CIRCUIT BREAKER
HEATER CIRCUIT BREAKER
28 V. D.C. SUPPLY 3/8 AMP FUSE
FUSEHOLDER
SPARE FUSE
CONDENSER FAN CIRCUIT BREAKER. MANUAL-RESET, AUTOMATIC-TRIPPING, THERMAL TYPE, PROTECTS CONDENSER FAN FROM OVERLOAD.
HEATER CIRCUIT BREAKER. MANUAL-RESET, AUTOMATIC TRIPPING, THERMAL TYPE. PROTECTS HEATER FROM OVERLOAD.

G. MASTER CIRCUIT BREAKER CONTROL PANEL (MODELS VEA4-3-102103 AND VEA4-3-102103MOD).

MEC 4120-210-15/2-2 ③

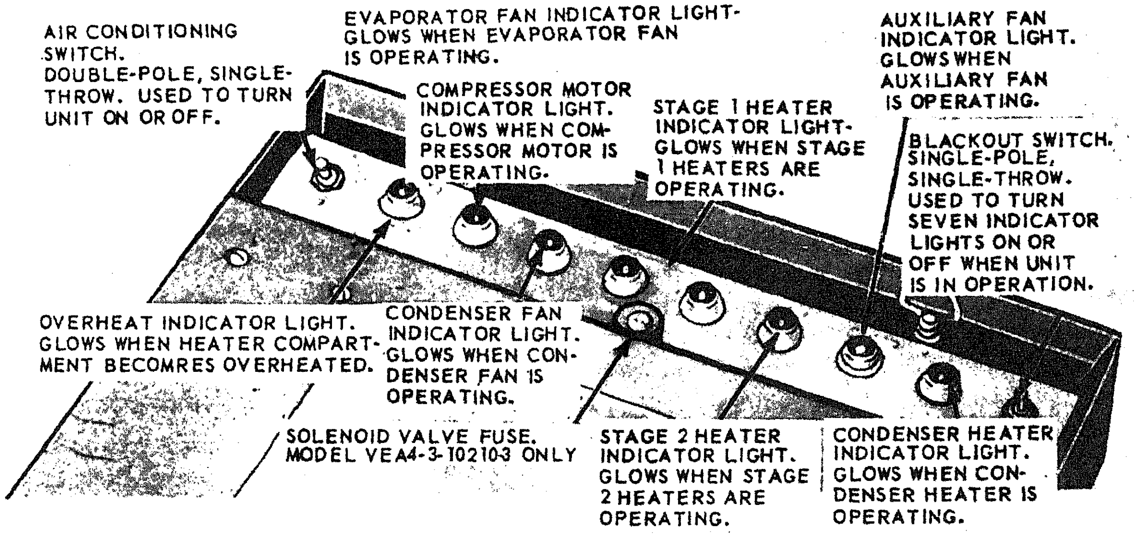
G

Figure 2-2—Continued.


EVAPORATOR FAN CIRCUIT BREAKER. MANUAL-RESET AUTOMATIC TRIPPING THERMAL TYPE. PROTECTS EVAPORATOR FAN FROM OVERLOAD.
WINTERIZATION KIT CIRCUIT BREAKER. MANUAL-RESET, AUTOMATIC TRIPPING, THERMAL TYPE. PROTECTS WINTERIZATION CIRCUIT FROM OVERLOAD.
MASTER CIRCUIT BREAKER. MANUALLY OPERATED PUSH-PULL THERMAL TYPE BREAKER. CONTROLS POWER TO UNIT AND ACTS AS ON-OFF SWITCH
COMPRESSOR MOTOR CIRCUIT BREAKER. MANUAL-RESET, AUTOMATIC-TRIPPING, THERMAL TYPE. PROTECTS COMPRESSOR MOTOR FROM OVERLOAD.
EVAPORATOR FAN
WINTERIZATION KIT CIRCUIT BREAKER
FUSE INDICATOR LIGHT. GLOWS TO INDICATE A DEFECTIVE FUSE
HEATER CIRCUIT BREAKER. MANUAL-RESET, AUTOMATIC TRIPPING, THERMAL TYPE PROTECTS HEATER FROM OVERLOAD.
CONDENSER FAN CIRCUIT BREAKER. MANUAL-RESET, AUTOMATIC TRIPPING, THERMAL TYPE. PROTECTS CONDENSER FAN FROM OVERLOAD.

H. MASTER CIRCUIT BREAKER CONTROL PANEL (MODELS VEA4-3-28029 AND VEA4-3-28029MOD).

NOTE: ON MODEL VEA4-3-102103MOD THE STAGE 1 AND STAGE 2 HEATER INDICATOR LIGHTS HAVE BEEN COMBINED INTO ONE HEATER INDICATOR LIGHT AND THE SOLENOID VALVE FUSE HAS BEEN REMOVED.


AIR CONDITIONING SWITCH. DOUBLE-POLE, SINGLE-THROW. USED TO TURN UNIT ON OR OFF.
EVAPORATOR FAN INDICATOR LIGHT-GLOWS WHEN EVAPORATOR FAN IS OPERATING.
AUXILIARY FAN INDICATOR LIGHT. GLOWS WHEN AUXILIARY FAN IS OPERATING.
COMPRESSOR MOTOR INDICATOR LIGHT. GLOWS WHEN COMPRESSOR MOTOR IS OPERATING.
STAGE 1 HEATER INDICATOR LIGHT-GLOWS WHEN STAGE 1 HEATERS ARE OPERATING.
BLACKOUT SWITCH. SINGLE-POLE, SINGLE-THROW. USED TO TURN SEVEN INDICATOR LIGHTS ON OR OFF WHEN UNIT IS IN OPERATION.
OVERHEAT INDICATOR LIGHT. GLOWS WHEN HEATER COMPARTMENT BECOMRES OVERHEATED.
CONDENSER FAN INDICATOR LIGHT. GLOWS WHEN CONDENSER FAN IS OPERATING.
SOLENOID VALVE FUSE. MODEL VEA4-3-102103 ONLY
STAGE 2 HEATER INDICATOR LIGHT. GLOWS WHEN STAGE 2 HEATERS ARE OPERATING.
CONDENSER HEATER INDICATOR LIGHT. GLOWS WHEN CONDENSER HEATER IS OPERATING.

I. EXTERNALLY MOUNTED CONTROL PANEL (MODELS VEA4-3-102103 AND VEA4-3-102103MOD).

MEC 4120-210-15/2-2 ④

H and I

Figure 2-2—Continued.

Section IV. OPERATION OF EQUIPMENT

). General

The instructions in this section are pub-d for the information and guidance of per-el responsible for the operation of the air itioners.

The operator must know how to perform y operation of which the air conditioners capable. This section gives instructions on ting and stopping the air conditioners, basic ons of the air conditioners, and coordinat-basic motions to perform specific tasks for h the equipment is designed. Since nearly y job presents a different problem, the op-or may have to vary given procedures to fit ndividual job.

1. Starting

Preparation for Starting.

(1) *Models VEA4-3, VEA4-3-28029, and VEA4-3-28029MOD.*

- (*a*) Perform the daily preventive maintenance services (para 3-5).
- (*b*) Make certain remote control cable (fig. 1-1) is firmly connected at the remote control box and the remote control receptacle.
- (*c*) Connect main power cable to main power receptacle.
- (*d*) Open master control panel door.
- (*e*) Place remote control switch in OFF position.
- (*f*) Trip master circuit breaker by pulling outward.
- (*g*) Place all other circuit breakers in ON position.
- (*h*) Turn fresh air damper control to desired position.

(2) *Models VEA4-3-102103 and VEA4-3-102103MOD.*

- (*a*) Perform the daily preventive maintenance services (par 3-5).
- (*b*) Connect external thermostat cable to remote control cable receptacle (fig. 1-2) (Model VEA4-3-102103 only).
- (*c*) Place air conditioning switch in OFF position.
- (*d*) Connect main power cable to main power receptacle.
- (*e*) Trip master circuit breaker by pulling outward.
- (*f*) Place all other circuit breakers in ON position.

b. Starting. Refer to figure 2-3 and start the air conditioners.

2-12. Stopping

Refer to figure 2-4 and stop the air conditioners.

2-13. Operation in Dusty or Sandy Areas

a. Install a screen or porous cloth over metal grille of condenser section rear panel, inlet opening of fresh air door (Models VEA4-3, VEA4-3-28029, and VEA4-3-28029MOD), and all duct openings in enclosure being conditioned (Models VEA4-3-102103 and VEA4-3-102103MOD).

b. Inspect and service air filter once a day (para 3-9) (Models VEA4-3, VEA4-3-28092 and VEA4-3-28029MOD).

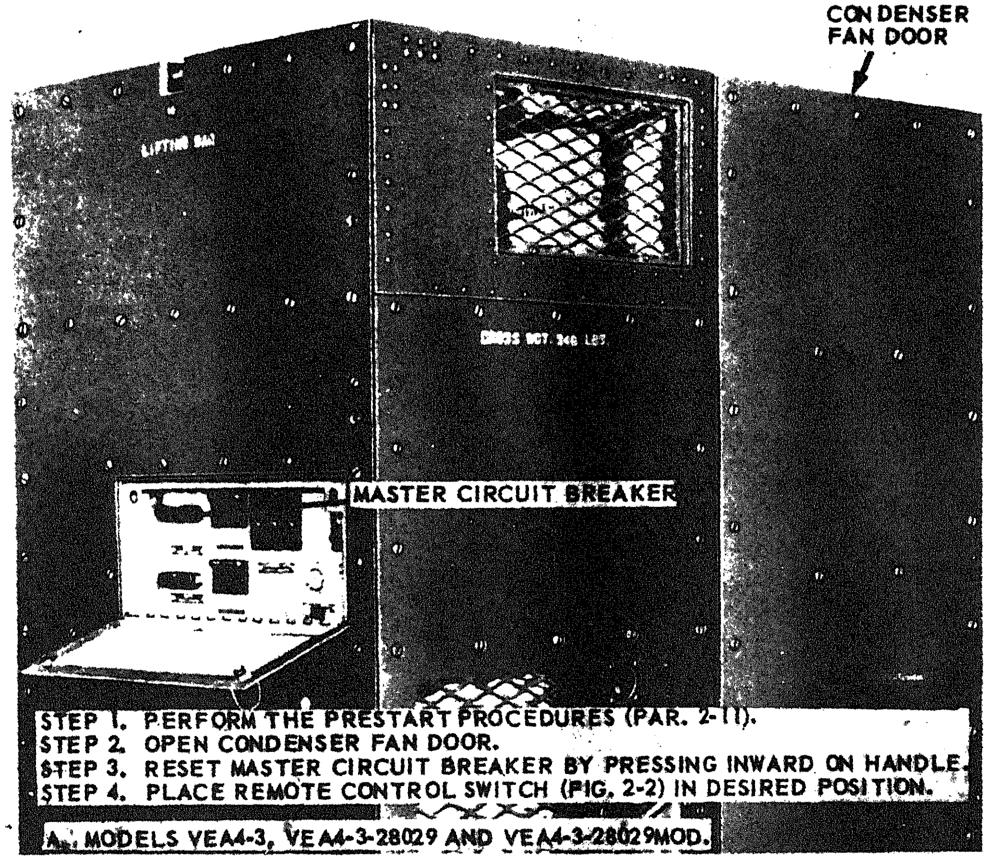
c. Clean the evaporator and condenser assemblies frequently (para 3-27 and 3-28).

2-14. Operation Under Rainy or Humid Conditions

a. Should the air conditioners be installed outside the compartment being conditioned, suitable shelter must be erected to protect them from rain or moisture.

b. Arrange for adequate ventilation and keep the electrical components dry and clean.

c. Special attention must be given to preventing rust and corrosion. Paint all surfaces that have chipped or peeled in accordance with TM 9-213.

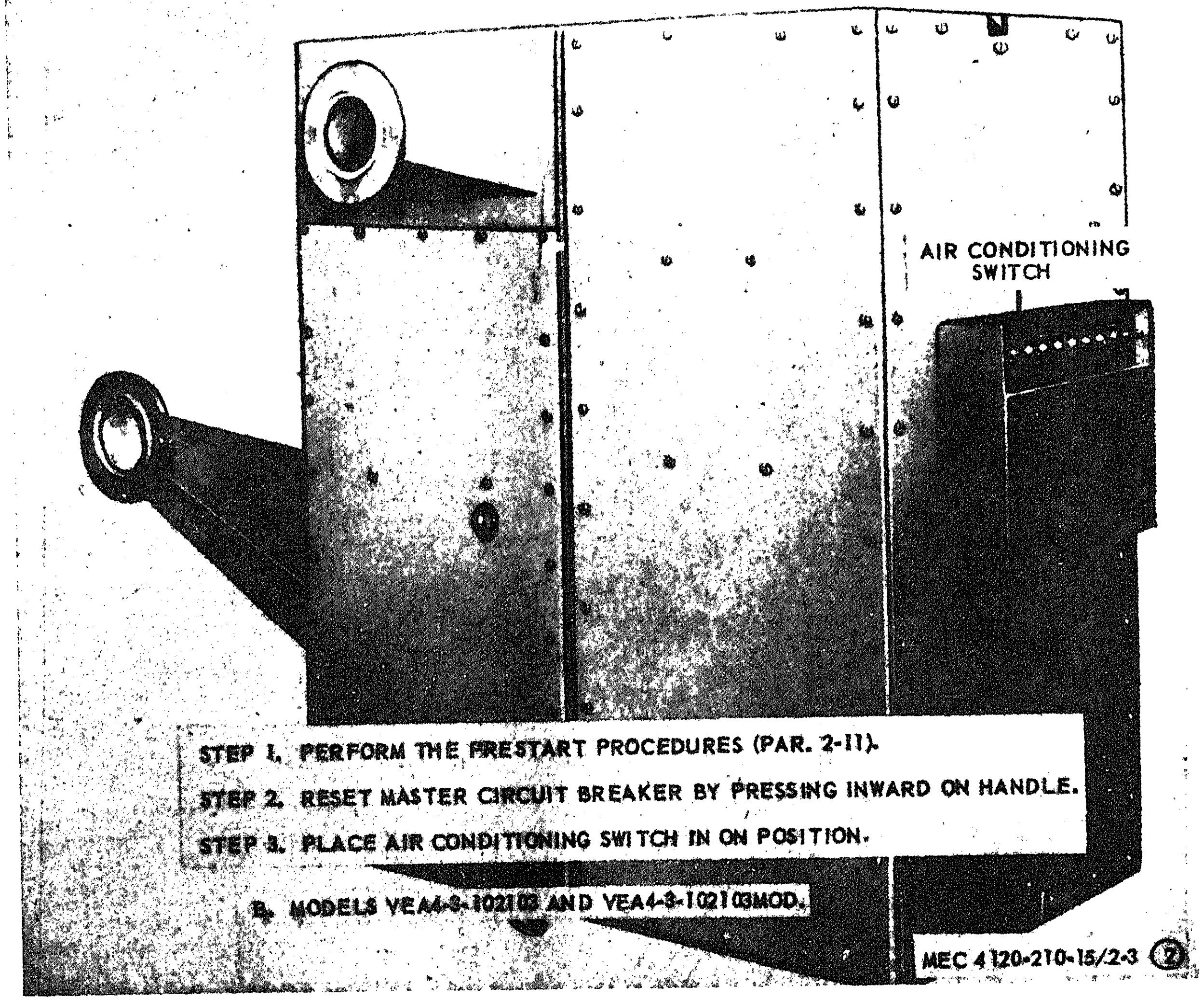


STEP 1. PERFORM THE PRESTART PROCEDURES (PAR. 2-11).
STEP 2. OPEN CONDENSER FAN DOOR.
STEP 3. RESET MASTER CIRCUIT BREAKER BY PRESSING INWARD ON HANDLE.
STEP 4. PLACE REMOTE CONTROL SWITCH (FIG. 2-2) IN DESIRED POSITION.

A. MODELS VEA4-3, VEA4-3-28029 AND VEA4-3-28029MOD.

MEC 4120-210-15/2-3 ①

Figure 2-3. Starting the air conditioners.



STEP 1. PERFORM THE PRESTART PROCEDURES (PAR. 2-11).

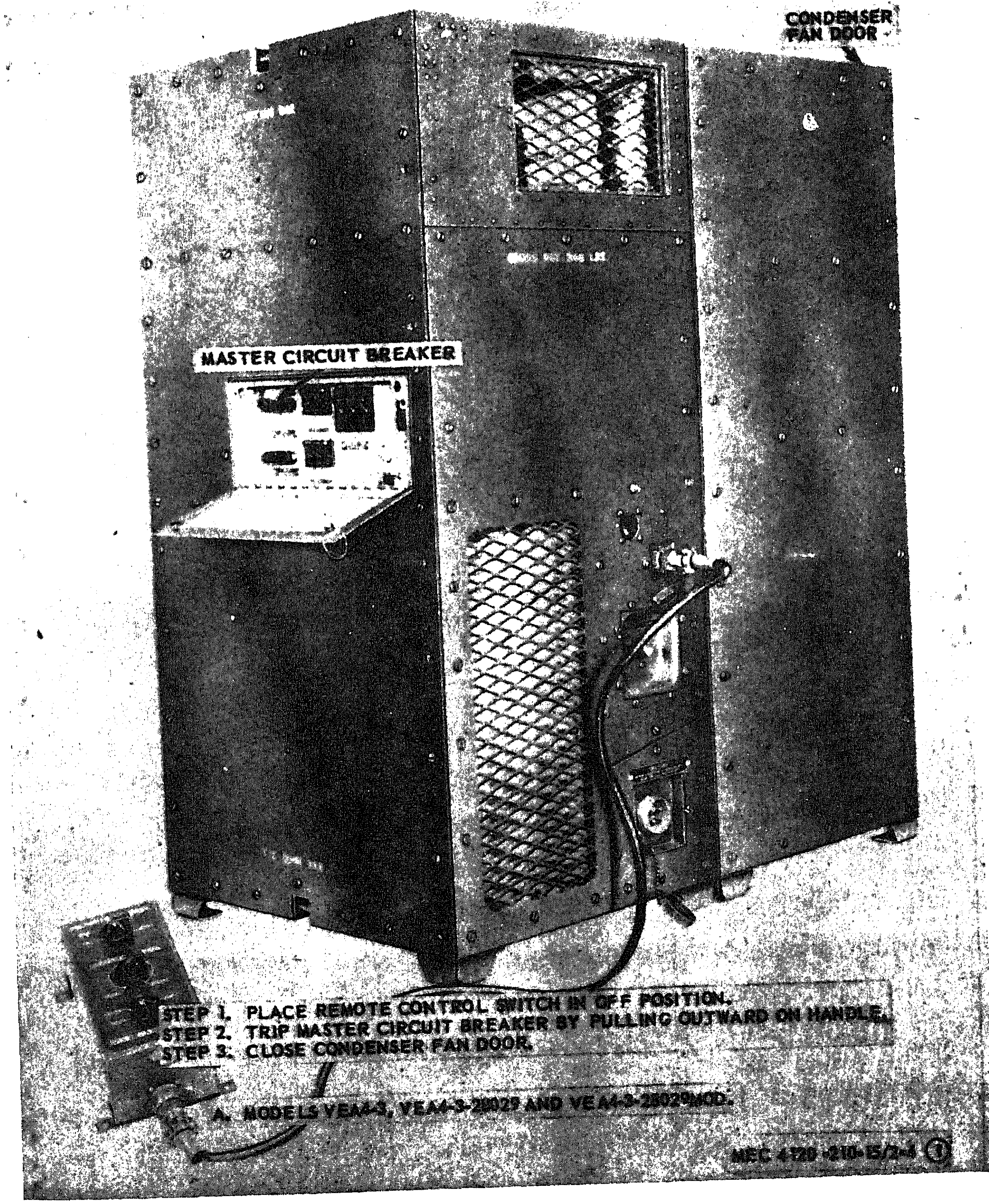
STEP 2. RESET MASTER CIRCUIT BREAKER BY PRESSING INWARD ON HANDLE.

STEP 3. PLACE AIR CONDITIONING SWITCH IN ON POSITION.

B. MODELS VEA4-3-102103 AND VEA4-3-102103MOD.

MEC 4120-210-15/2-3 ②

Figure 2-3—Continued.



STEP 1. PLACE REMOTE CONTROL SWITCH IN OFF POSITION.

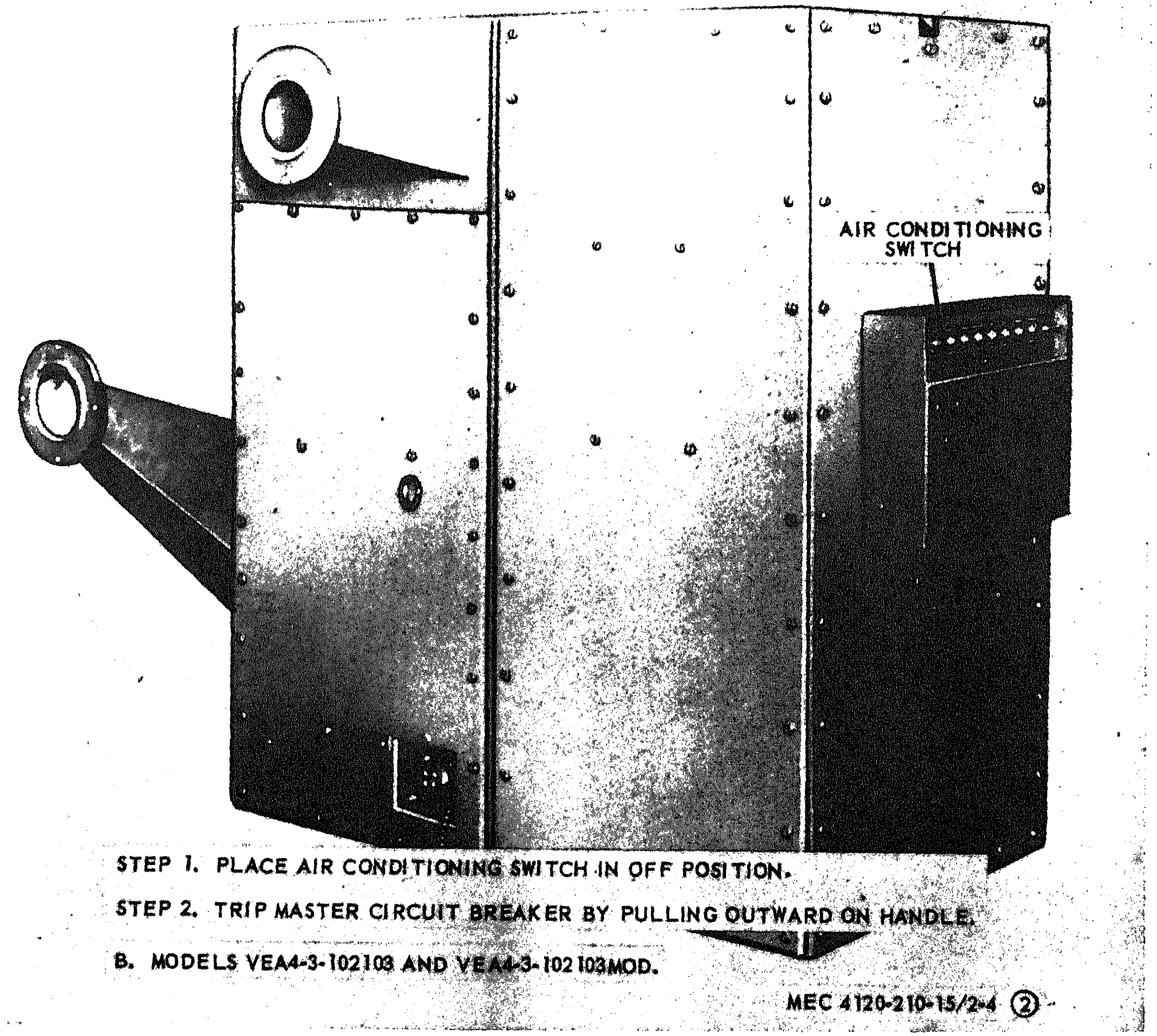
STEP 2. TRIP MASTER CIRCUIT BREAKER BY PULLING OUTWARD ON HANDLE.

STEP 3. CLOSE CONDENSER FAN DOOR.

A. MODELS VEA4-3, VEA4-3-28029 AND VEA4-3-28029MOD.

MEC 4120-210-15/2-4 ①

Figure 2-4. Stopping the air conditioners.



STEP 1. PLACE AIR CONDITIONING SWITCH IN OFF POSITION.

STEP 2. TRIP MASTER CIRCUIT BREAKER BY PULLING OUTWARD ON HANDLE.

B. MODELS VEA4-3-102103 AND VEA4-3-102103MOD.

MEC 4120-210-15/2-4 ②

Figured 2–4—Continued.

CHAPTER 3

OPERATOR AND ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. OPERATOR AND ORGANIZATIONAL MAINTENANCE TOOLS AND EQUIPMENT

3–1. Special Tools and Equipment

No special tools or equipment are required by operator or organizational maintenance personnel for maintenance of the air conditioners.

3–2. Basic Issue Tools and Equipment

Tools and repair parts issued with or authorized for use with the air conditioners are listed in the basic issue items list, appendix B of this manual.

3–3. Organizational Maintenance Repair Parts

Organizational maintenance repair parts are listed and illustrated in TM 5–4120–210–25P.

Section II. PREVENTIVE MAINTENANCE SERVICES

3–4. General

To insure that the air conditioners are ready for operation at all times, they must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance services to be performed are listed and described in paragraphs 3–5 and 3–6. Item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the units will be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noticed which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded together with the corrective action taken on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) at the earliest possible opportunity.

3–5. Daily Preventive Maintenance Services

This paragraph contains an illustrated, tabulated listing of preventive maintenance services which must be performed by the operator. The item numbers are listed consecutively and indicate the sequence of minimum requirements. Refer to figure 3–1 for the daily preventive maintenance services.

3–6. Quarterly Preventive Maintenance Services

a. This paragraph contains an illustrated tabulated listing of preventive maintenance services which must be performed by organizational maintenance personnel at quarterly intervals. A quarterly interval is equal to 3 calendar months, or 250 hours of operation, whichever occurs first.

b. The item numbers are listed consecutively and indicate the sequence of minimum requirements. Refer to figure 3-2 for the quarterly preventive maintenance services.

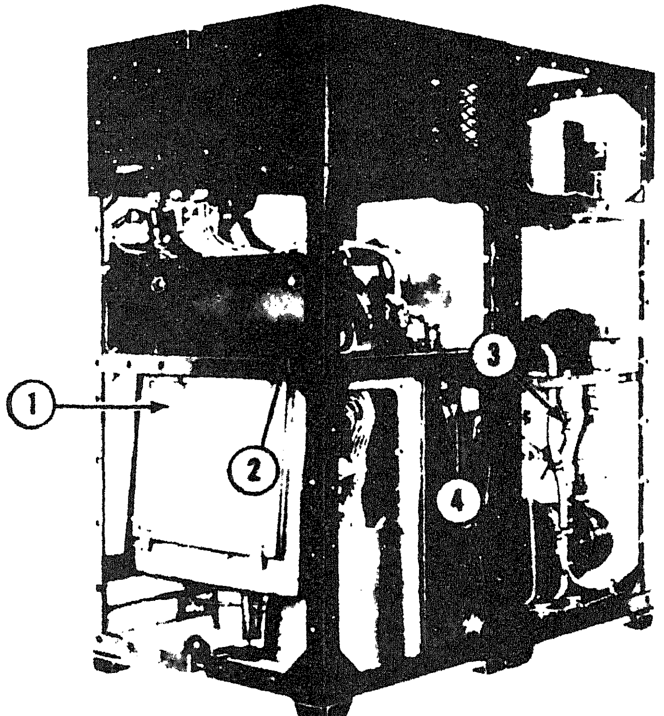
PREVENTIVE MAINTENANCE SERVICES

DAILY

TM 5-4120-210-15

FAIRCHILD STRATOS MODELS VEA4-3,
VEA4-3-28029 AND VEA4-3-28029MOD

AIR CONDITIONER



ITEM		PAR REF
1	AIR FILTER Inspect for obstructions and dirt.	3-9
2	REFRIGERANT SIGHT GLASS. Inspect for presence of bubbles or a milky flow, which indicates a low refrigerant charge.	2-9
3	OIL FLOW SIGHT GLASS. Inspect for improper flow. A steady dripping or thin flow indicates a normal oil level.	2-9
4	CONTROLS AND INSTRUMENTS Inspect for damage of the remote and master control panels	2-9
	NOTE 1. OPERATION During operation observe for any unusual noise or vibration	

MEC 4120-210-15 3-1 ①

Models VEA4-3, VEA4-3-28029 and VEA4-3-28029MOD

Figure 3-1. Daily preventive maintenance services.

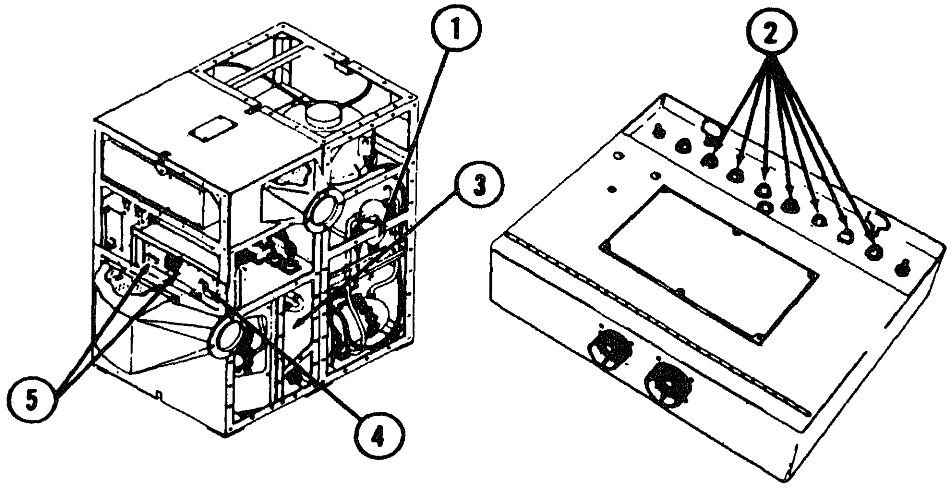
PREVENTIVE MAINTENANCE SERVICES

DAILY

TM5-4120-210-15

FAIRCHILD STRATOS MODELS VEA4-3-102103
AND VEA4-3-102103MOD

AIR CONDITIONER



ITEM		PAR REF
1	OIL FLOW SIGHT GLASS. Inspect for compressor oil flow. A steady dripping or thin flow indicates a normal oil level.	2-9
2	INDICATOR LAMPS. Inspect the indicator lamps for a defective filament. Replace a defective lamp.	4-47
3	REFRIGERANT SIGHT GLASS. Inspect refrigerant. Milky flow indicates moisture. Bubbles indicate low charge.	2-9
4	FUSE. Inspect the fuse holder. If the indicator light is glowing, fuse is defective. Replace a defective fuse.	3-8
5	CONTROLS AND INSTRUMENTS. Inspect for damage. With unit operating, inspect for improper operation.	2-9
	NOTE 1. OPERATION. During operation, observe for any unusual noise or vibration.	

MEC 4120-210-15/3-1 ②

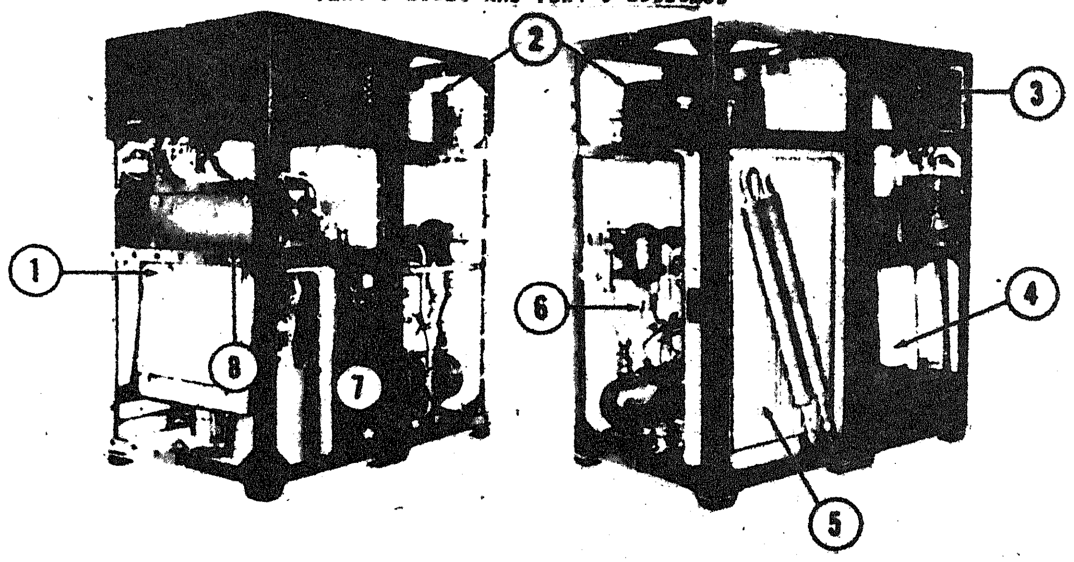
Models VEA4-3-102103 and VEA4-3-102103MOD

Figure 3-1—Continued

PREVENTIVE MAINTENANCE SERVICES

QUARTERLY

TM 5-4120-210-15 FAIRCHILD STRATOS MODELS VEA4-3, VEA4-3-28029 AND VEA4-3-28029MOD AIR CONDITIONER



ITEM		PAR REF
1	AIR FILTER. Inspect for obstructions and dirt. Clean a dirty filter.	3-9
2	FANS. Inspect for damage and abnormal vibration. Inspect motors for signs of overheating.	
3	MOTOR CONTROL ASSEMBLY. Inspect for damage and improper operation of the reset buttons.	
4	HEATER AND WIRING. Inspect for damage and improper operation.	
5	CONDENSER: Inspect for accumulated dirt and damage.	3-28
6	OIL FLOW SIGHT GLASS. Inspect for improper oil flow. A steady dripping or thin flow indicates a normal oil level.	2-9
7	REFRIGERANT SIGHT GLASS. Inspect for presence of bubbles or a milky flow, which indicates a low refrigerant charge.	2-9
8	CONTROLS AND INSTRUMENTS. Inspect for damage of the remote control and master control panels. Inspect remote control wiring for worn or frayed condition.	2-9
	NOTE 1. OPERATIONAL TEST. During operation observe, for any unusual noise or vibration.	

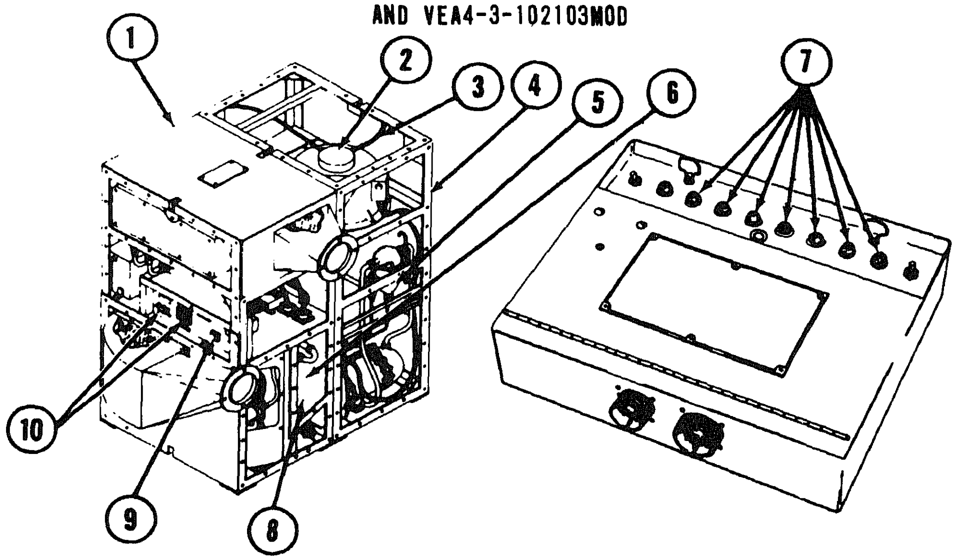
MEC 4120-210-15/3-2 ①

Models VEA4-3, VEA4-3-28029 and VEA4-3-28029MOD
Figure 3-2. Quarterly preventive maintenance services.

PREVENTIVE MAINTENANCE SERVICES

QUARTERLY

TM5-4120-210-15 FAIRCHILD STRATOS MODELS VEA4-3-102103 AND VEA4-3-102103MOD AIR CONDITIONER



ITEM		PAR REF
1	EVAPORATOR FAN AND MOTOR. Inspect for damage and freedom of movement.	
2	CONDENSER FAN AND MOTOR. Inspect for damage and freedom of movement.	
3	ELECTRICAL WIRING. Inspect the wiring for loose connections and cracked insulation.	
4	CONDENSER. Inspect for leaks, corrosion, dust and dirt.	3-28
5	OIL FLOW SIGHT GLASS. Inspect for compressor oil flow. A steady dripping or thin flow indicates a normal oil level.	2-9
6	EVAPORATOR. Inspect for leaks, corrosion, dust and dirt.	3-27
7	INDICATOR LAMPS. Inspect the indicator lamps for a defective filament. Replace a defective lamp.	79
8	REFRIGERANT SIGHT GLASS. Inspect refrigerant. Milky flow indicates moisture. Bubbles indicate low charge.	2-9
9	FUSE. Inspect the fuse holder. If the indicator light is glowing, fuse is defective. Replace a defective fuse.	3-8

MEC 4120-210-15/3-2 ②

Models VEA4-3-102103 and VEA4-3102103MOD
Figure 3-2—Continued.

ITEM		PAR REF
10	CONTROLS AND INSTRUMENTS. Inspect for damage. With unit operating, inspect for improper operation.	2-9
	NOTE 1. OPERATIONAL TEST. During operational test, observe for any unusual noise or vibration.	

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Models VEA4-3-102108 and VEA4-3-102108MOD

Figure 3-2—Continued.

Section III. OPERATOR'S MAINTENANCE

3-7. General

Instructions contained in this section are published for the information and guidance of the operator to maintain the air conditioners.

3-8. Master Circuit Breaker and Solenoid Valve Fuses

Refer to figure 3-3 and replace the master circuit breaker and solenoid valve fuses.

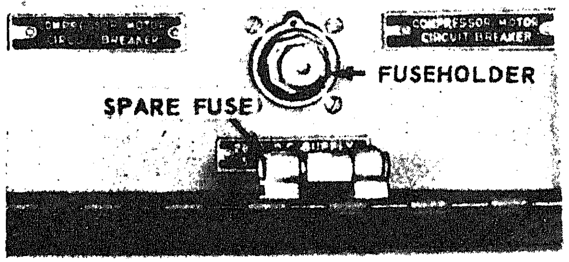
3-9. Air Filter (Models VEA4-3, VEA4-3-28029, AND VEA4-3-28029MOD)

a. Remove evaporator section left-side panel (para 3-23).

b. Refer to figure 3-4 for removal and installation of air filter.

c. Inspect air filter while in place. If filter is visibly loaded with dirt, lent, or foreign matter, remove from evaporator for cleaning and lubrication.

NOTE: IF LAMP IN FUSEHOLDER IS BURNING, FUSE IS DEFECTIVE.



STEP 1. OPEN MASTER CIRCUIT BREAKER CONTROL PANEL DOOR.
STEP 2. REMOVE FUSEHOLDER AND FUSE BY PUSHING INWARD AND TURNING COUNTERCLOCKWISE.
STEP 3. REPLACE DEFECTIVE FUSE WITH SPARE FUSE.
STEP 4. DEPRESS FUSEHOLDER AND FUSE INTO CONTROL PANEL, TURN COUNTERCLOCKWISE AND SECURE.
STEP 5. CLOSE PANEL DOOR.

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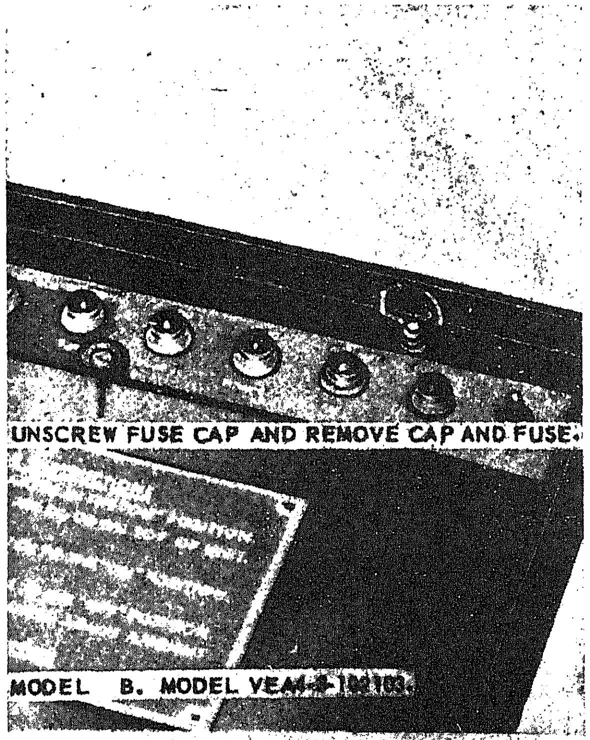
Master circuit breaker fuse

Figure 3-3. Fuse replacement.



MEC 4120-210-3-3 ②

Figure 3-3—Continued.

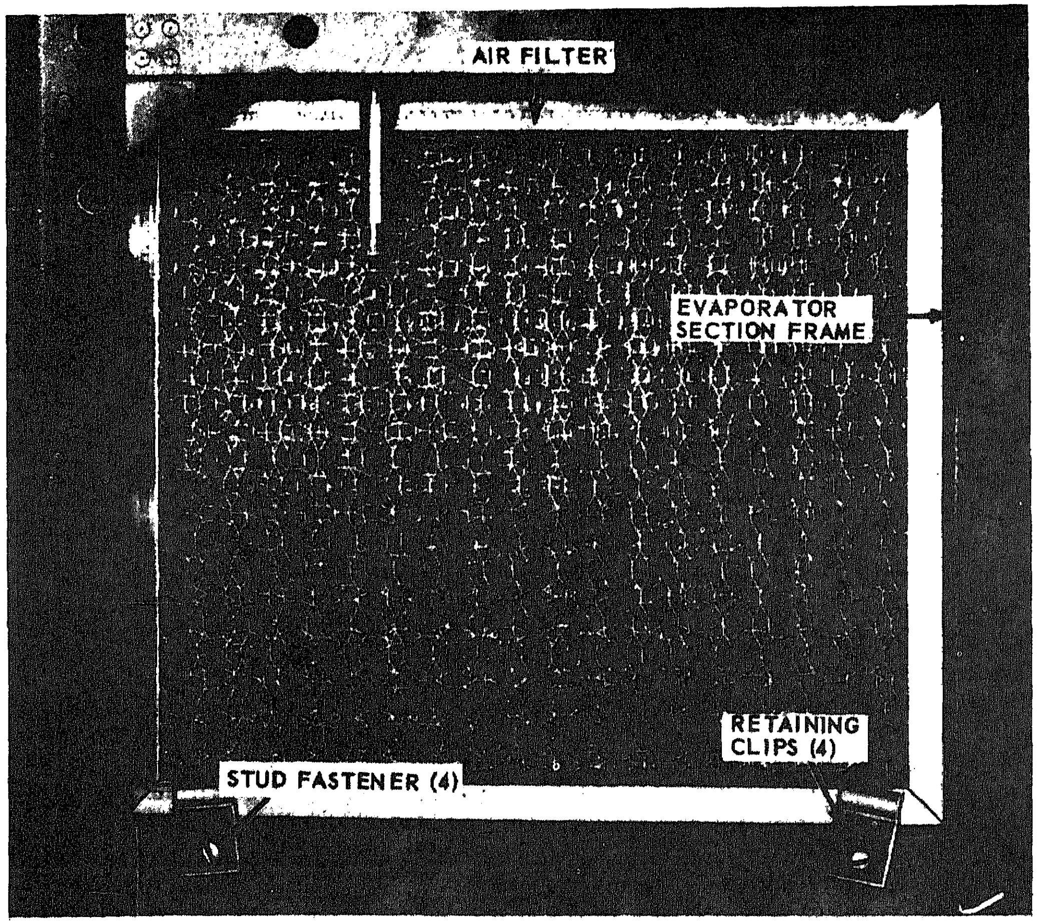
Note. Do not throw away filter. It is a permanen type and can be reused after cleaning.

d. Clean air filter by submerging in a container of soapsuds and rinsing with clean water Allow filter to dry thoroughly prior to lubrication.

Note. Vacuum clean the evaporator if there i evidence of contamination after removal of air filter.

e. Spray light coat of oil on filter "AIR INLET SIDE". Keep spray nozzle about 12 to 1 inches from filter. Put enough filter fluid on t wet filter media lightly and evenly.

Note. After installation of filter in evaporato inspect every 24 hours of unit operation. Clean an lubricate filter every 48 hours of unit operation or les contingent upon operating conditions.



STEP 1. LOOSEN STUD FASTENERS THAT SECURE RETAINING CLIPS TO EVAPORATOR SECTION FRAME.

STEP 2. REMOVE AIR FILTER FROM ITS RECESS IN EVAPORATOR SECTION FRAME.

MEC 4120-210-15/3-4

Figure 3-4. Air filter, removal and installation.

Section IV. TROUBLESHOOTING

3-10. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the air conditioners and their components. Each trouble sympton stated is followed by a list of probable causes. The possible remedy recommended is described opposite the probable cause. Any trouble beyond the scope of organizational maintenance must be reported to direct support maintenance.

3-11. Air Conditioner Fails To Start

Probable cause	Possible remedy
Power off	Inspect power cable for proper connection.
Master circuit breaker not in proper position.	Push master circuit inward.
Fuse blown	Replace fuse (para 3-9).
Condenser fan door closed (Models VEA4-3, VEA4-3-28029 and VEA4-3-28029 MOD).	Open door.

3-12. Cooling Insufficient

Probable cause	Possible remedy
Condenser coil and subcooler dirty.	Clean condenser coil and subcooler (para 3-28).
Evaporator coil or air filter dirty.	Clean evaporator (para 3-27). Clean or replace air filter (para 3-9).
Refrigerant charge insufficient.	Inspect charge through sight glass window (para 2-9). Report low charge to direct support maintenance.
Condenser fan circuit breaker tripped.	Reset fan circuit breaker (para 2-9). If condition persists report to direct support maintenance.

3-13. Heating Insufficient

Probable cause	Possible remedy
Selector knobs on remote control box not properly positioned.	Set selector knobs in proper position for heating cycle.
Heater circuit breaker tripped	Reset heater circuit breaker (para 2-9). If condition persists, report to direct support maintenance.
Thermostat defective	Replace thermostat (para 3-34, 3-35, or 3-36).

3-14. Air Conditioner Stops

Probable cause	Possible remedy
Power failure	Inspect power cable for defects or external power source for proper operation.
Fuse at master circuit breaker control panel blown.	Replace fuse (para 3-8).
Master circuit breaker tripped.	Reset master circuit breaker (para 2-9). If condition persists report to direct support maintenance.

3-15. Compressor Noisy

Probable cause	Possible remedy
Oil insufficient	Inspect oil flow through oil sight glass. Report insufficient flow to direct support maintenance.

3-16. Compressor Stops of High Head Pressure

Probable cause	Possible remedy
Condenser and subcooler dirty.	Clean condenser and subcooler (para 3-28).
Air in refrigeration system	Inspect refrigrant charge through sight glass (para 2-9). Report low charge to direct support maintenance.

3-17. Cooling Excessive

Probable cause	Possible remedy
Remote control selector set too high (Models VEA4-3 and VEA4-3-28029MOD).	Adjust selector for lower cooling range.
Thermostat defective	Replace thermostat (para 3-34, 3-35, or 3-36).

Section V. FIELD EXPEDIENT REPAIRS

3-18. General

Maintenance troubles may occur while the air conditioners are operating where repair parts are not available and normal corrective action cannot be performed. When this condition exists, the following expedient remedies may be used in emergencies, upon the decision of the unit commander. Equipment so repaired must be removed from operation as soon as possible and properly repaired before being placed in operation again.

3-19. Housing Damaged

Trouble	Expedient remedy
External panel damaged	Remove panel (para 3-23). Substitute plywood panel.

3-20. Cooling Insufficient

Trouble	Expedient remedy
Air filter damaged beyond repair.	Remove air filter (para 3-9). Operate without filter.

3-21. Air Conditioner Stops

Trouble	Expedient remedy
Fuse blown with no spare available.	Wrap defective fuse in ti foil or position a piece copper wire lengthwise the fuse and reinstall i fuseholder.

Section VI. HOUSING PANELS

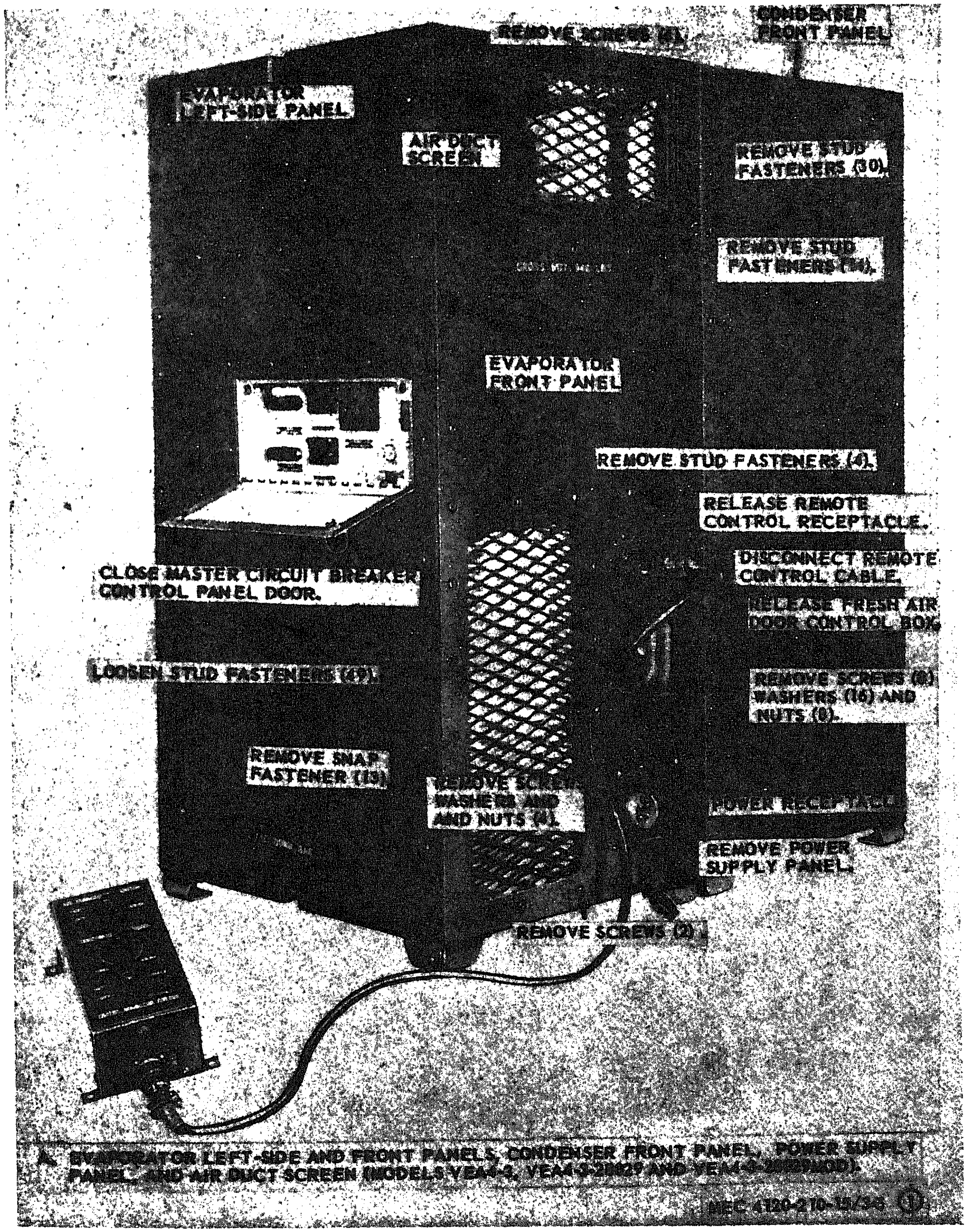
3-22. General

The air conditioners are inclosed in sheet aluminum panels mounted on a rigid aluminum frame and secured with machine screws and quarter-turn stud fasteners (quantity and location may vary between models but are removed in a similar manner). The housing panels are insulated on the interior face by fixed layers of fiber glass or sponge rubber to provide additional soundproofing. All contact edges are sealed with a continous strip of gasket material. The air inlets and outlets are provided with expanded metal screens permanently welded to the panel. Models VEA4-3, VEA4-3-28029, and VEA4-3-28029MOD secure the conditioned air outlet screen to panel with machine screws.

3-23. Housing Panels

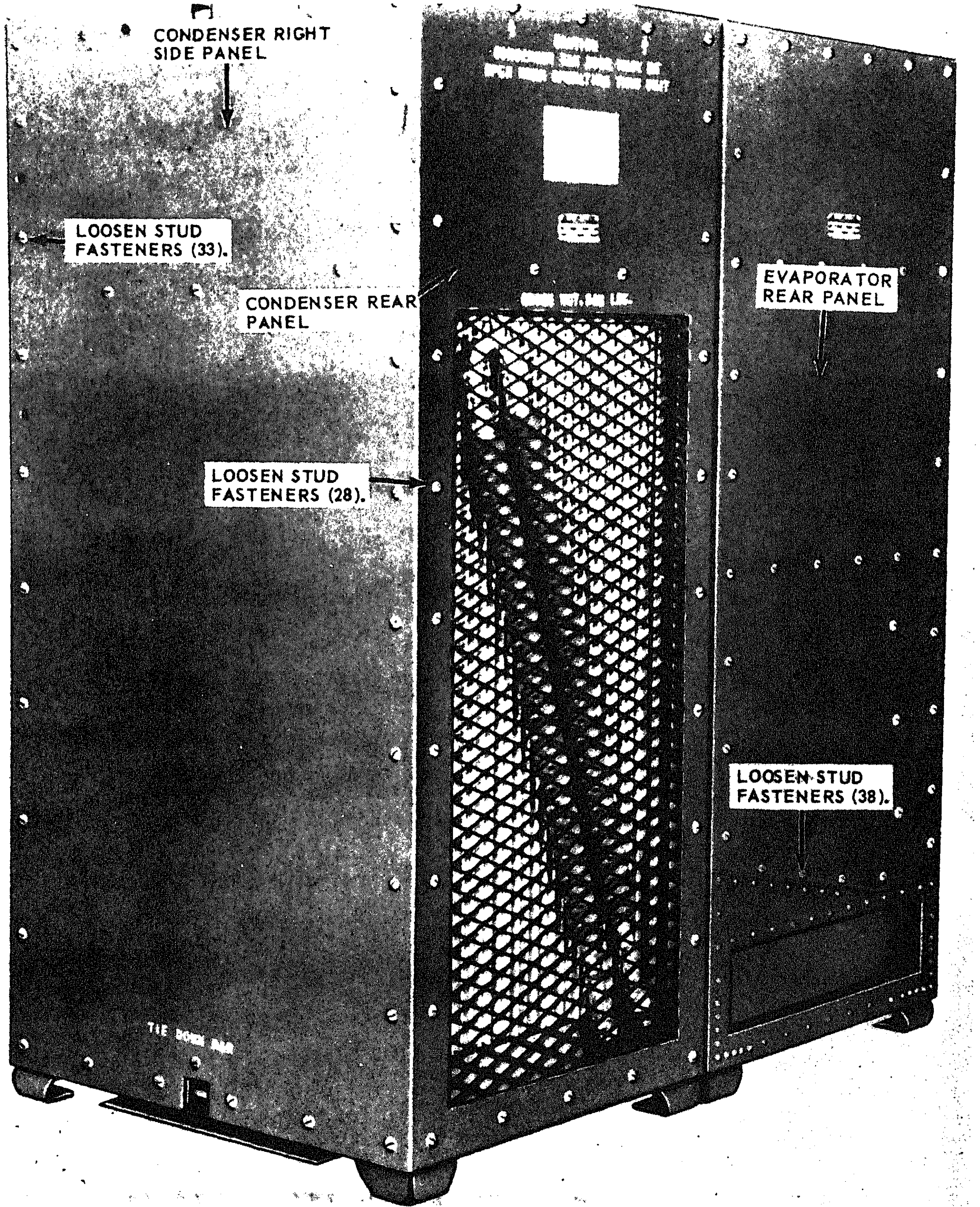
Refer to figure 3-5 for removal and installation of housing panels.

Warning: **Do not operate unit with panels removed.**


REMOVE SCREWS (4).
CONDENSER FRONT PANEL.
EVAPORATOR LEFT-SIDE PANEL.
AIR DUCT SCREEN.
REMOVE STUD FASTENERS (30).
REMOVE STUD FASTENERS (14).
EVAPORATOR FRONT PANEL
REMOVE STUD FASTENERS (4).
RELEASE REMOTE CONTROL RECEPTACLE.
DISCONNECT REMOTE CONTROL CABLE.
RELEASE FRESH AIR DOOR CONTROL BOX.
CLOSE MASTER CIRCUIT BREAKER CONTROL PANEL DOOR.
LOOSEN STUD FASTENERS (4).
REMOVE SCREWS (8) WASHERS (16) AND NUTS (8).
REMOVE SNAP FASTENER (13).
REMOVE SCREWS, WASHERS AND AND NUTS (4).
POWER RECEPTACLE.
REMOVE POWER SUPPLY PANEL.
REMOVE SCREWS (2).
A. EVAPORATOR LEFT-SIDE AND FRONT PANELS, CONDENSER FRONT PANEL, POWER SUPPLY PANEL, AND AIR DUCT SCREEN (MODELS VEA4-3, VEA4-3-28029 AND VEA4-3-28029MOD).
MEC 4120-210-15/3-5 ①

A

Figure 3-5. Housing panels, removal and installation.

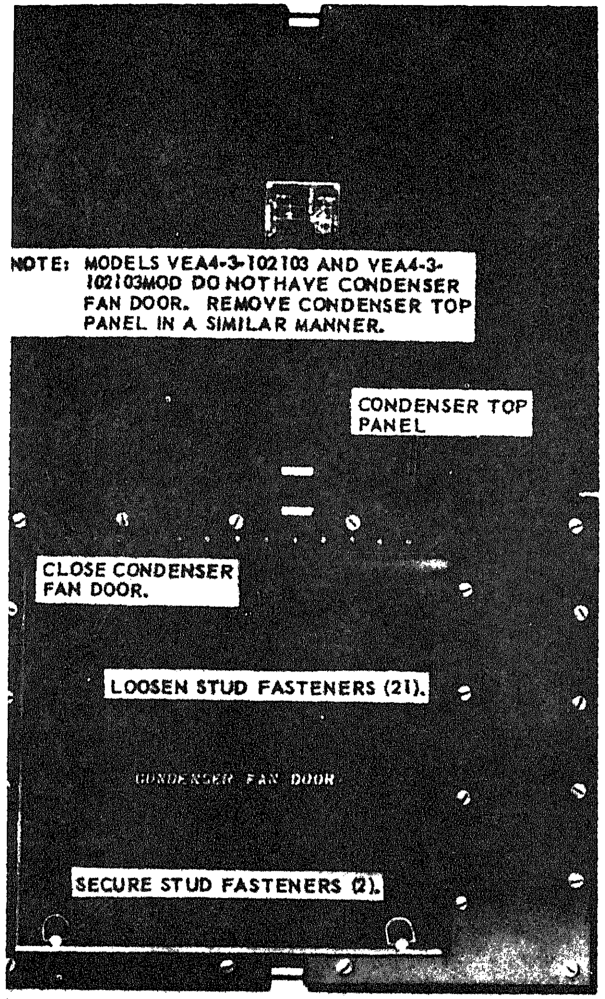

CONDENSER RIGHT SIDE PANEL
LOOSEN STUD FASTENERS (33).
CONDENSER REAR PANEL
LOOSEN STUD FASTENERS (28).
EVAPORATOR REAR PANEL
LOOSEN STUD FASTENERS (38).

B. CONDENSER RIGHT-SIDE AND REAR PANELS, AND EVAPORATOR REAR PANEL (MODELS VEA4-3, VEA4-3-28029 AND VEA4-3-28029MOD).

MEC 4120-210-15/3-5 ②

B

Figure 3-5—Continued.


NOTE: MODELS VEA4-3-102103 AND VEA4-3-102103MOD DO NOT HAVE CONDENSER FAN DOOR. REMOVE CONDENSER TOP PANEL IN A SIMILAR MANNER.

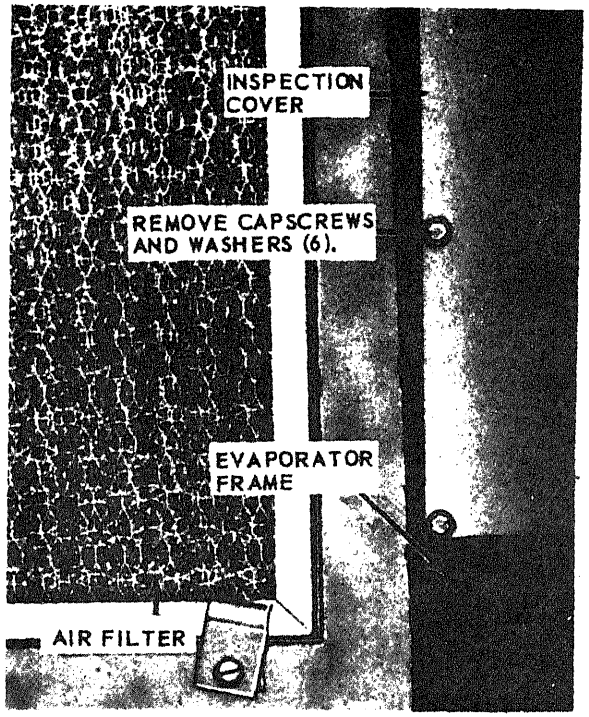
CONDENSER TOP PANEL
CLOSE CONDENSER FAN DOOR.
LOOSEN STUD FASTENERS (21).
CONDENSER FAN DOOR
SECURE STUD FASTENERS (2).

C. CONDENSER TOP PANEL.

MEC 4120-210-15/3-5 ③

C

Figure 3-5—Continued.



D. INSPECTION COVER (MODELS VEA4-3, VEA4-3-28029 AND VEA4-3-28029MOD).

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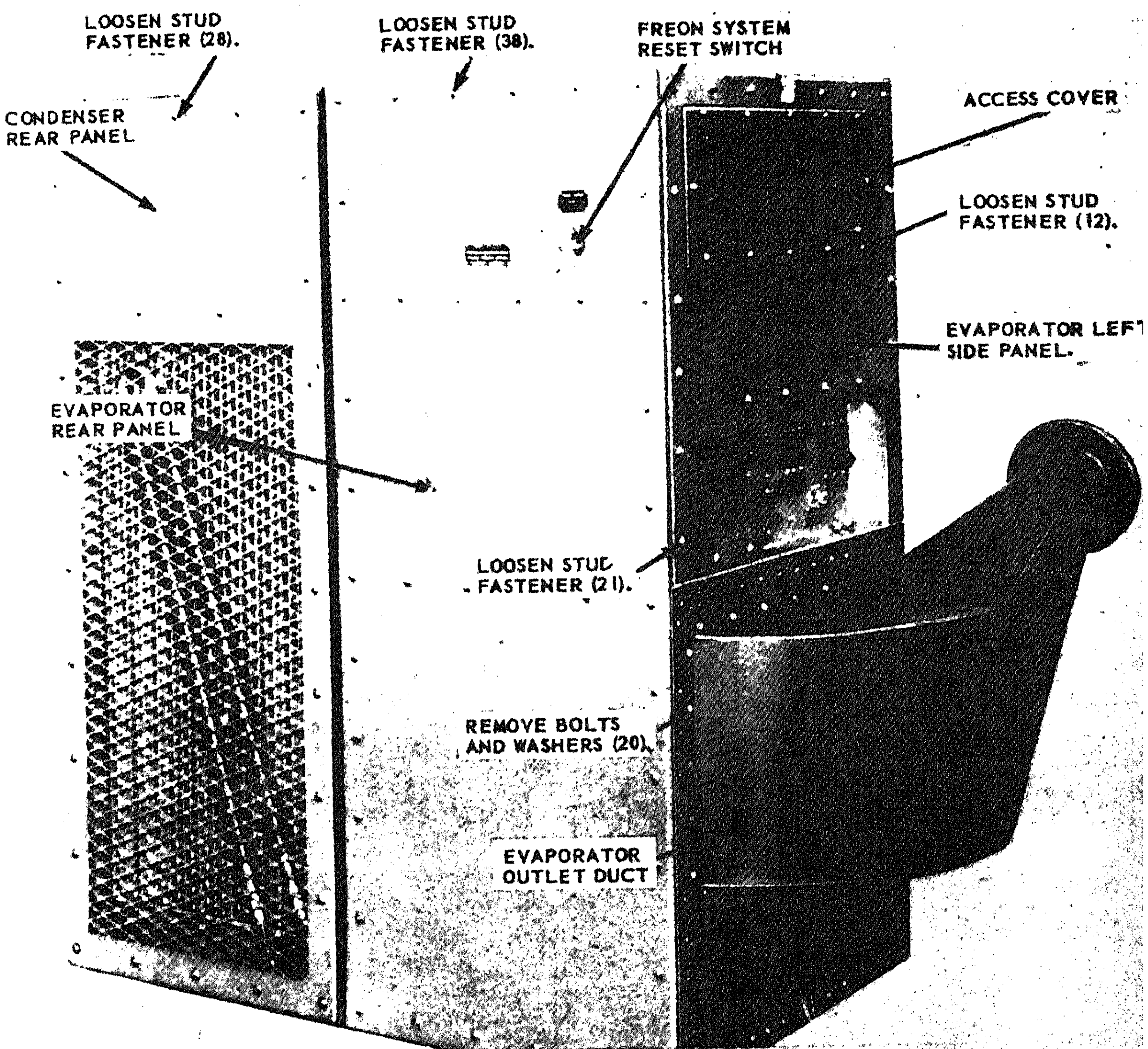
D

Figure 3-5—Continued.


LOOSEN STUD FASTENER (28).
LOOSEN STUD FASTENER (38).
FREON SYSTEM RESET SWITCH
CONDENSER REAR PANEL
ACCESS COVER
LOOSEN STUD FASTENER (12).
EVAPORATOR LEFT SIDE PANEL.
EVAPORATOR REAR PANEL
LOOSEN STUD FASTENER (21).
REMOVE BOLTS AND WASHERS (20).
EVAPORATOR OUTLET DUCT

E. CONDENSER REAR PANEL, AND EVAPORATOR REAR AND LEFT-SIDE PANELS (MOD VEA4-3-102103 AND VEA4-3-102103MOD).

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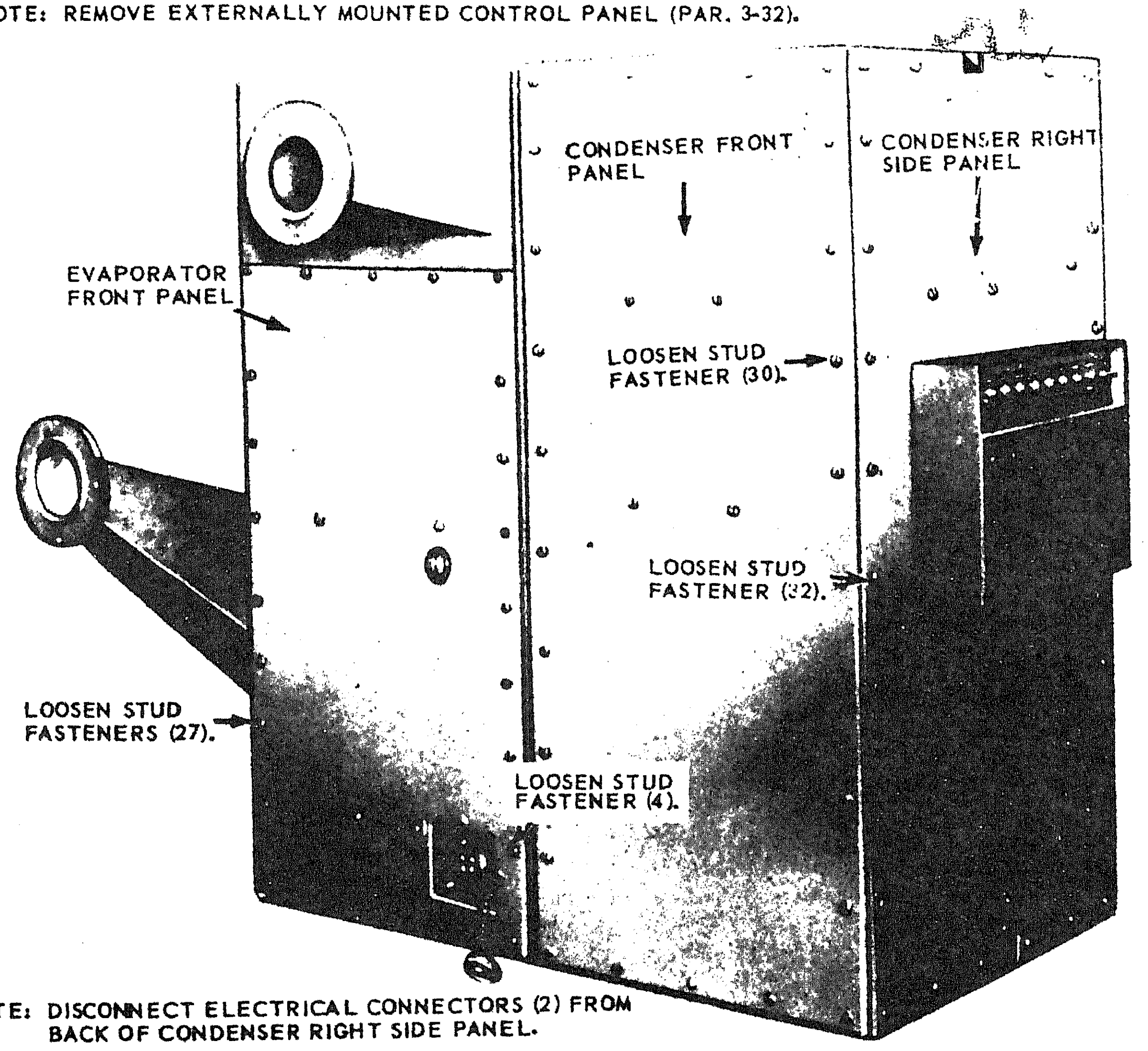
E

Figure 3-5—Continued.

NOTE: REMOVE EXTERNALLY MOUNTED CONTROL PANEL (PAR. 3-32).


CONDENSER FRONT PANEL
CONDENSER RIGHT SIDE PANEL
EVAPORATOR FRONT PANEL
LOOSEN STUD FASTENER (30).
LOOSEN STUD FASTENER (32).
LOOSEN STUD FASTENERS (27).
LOOSEN STUD FASTENER (4).

NOTE: DISCONNECT ELECTRICAL CONNECTORS (2) FROM BACK OF CONDENSER RIGHT SIDE PANEL.

F. EVAPORATOR FRONT PANEL AND CONDENSER FRONT AND RIGHT SIDE PANELS (MODELS VEA4-3-102103 AND VEA4-3-102103 MOD).

MEC 4120-210-15/3-5 ⑥

F

Figure 3-5—Continued.

Section VII. AIR CIRCULATION SYSTEM

3–24. General

a. Model VEA4–3. The air conditioner has two separate air circulation systems operated by a common set of controls. The fan of the evaporator circulation system is an integral part of the evaporator section ductwork and distributes cooled, heated, or fresh air as demanded by the mode in which the unit is operating. The three modes of operation are manually controlled by the selector switches on the remote control assembly designated as HEAT, VENT, and COOL. In the VENT cycle, fresh air is supplied by operating the fresh air door control knob. The evaporator fan is operated by a 208/416-volt, 400-cycle, 3-phase motor rated at 5,400 rpm and has a displacement of 1,190 cfm. The condenser circulation fan is located in the top of the condenser section. It exhausts warm air from the condenser coil and the compressor area. The fan is driven by a 208/416-volt, 400-cycle, 3-phase motor rated at 5,400 rpm and has a displacement of 4,100 cfm.

b. Models VEA4–3–102103 and VEA4–3–102103MOD. Air circulation in evaporation section of these models has been reversed and fresh air inlet door and control has been removed. Air inlet duct, at top of evaporator section front panel allows evaporator fan to draw air from compartment ductwork, down through heater manifold and evaporator, and out through discharge air duct adapter to the compartment being conditioned. Mixture of fresh air with conditioned air is provided through compartment ductwork, and control of mode is automatic. Condenser and evaporator fans operate on 208-volt power.

c. Model VEA4–3–28029. The circulation of air by this model is similar to that described in *a* above except that control of mode is automatic and VENT cycle has been eliminated. Fresh air inlet door is used by operator to mix fresh air with compartment conditioned air as required. Condenser and evaporator fans operate on 208-volt power.

d. Model VEA4–3–28029MOD. The circulation and power requirements of this model are the same as *c* above except that operator may select heating or cooling mode.

3–25. Fresh Air Inlet Door Control Assembly (Models VEA4–3, VEA4–3–28029 and VEA4–3–28029 MOD)

Refer to figure 3–6 for removal, disasse bly, reassembly, and installation of fresh air i let door control assembly.

3–26. Evaporator Outlet Duct (Models VEA4–3–102103 and VEA4–3–102103MOD)

Refer to figure 3–5 as for removal and inst lation of evaporator outlet duct.

3–27. Evaporator Assembly

a. Remove air filter (fig. 3–4).

b. Remove evaporator section rear pa (fig. 3–5).

c. Clean core fins of evaporator assem (fig. 1–10) with compressed air by directi airstream through the fins left to right.

***Caution:* Use only compressed air to cle the core fins. Brushing may cause dama to fins that would result in partial obstructi of normal air flow.**

d. Install evaporator section rear panel (fi 3–5).

e. Install air filter (Fig. 3–4).

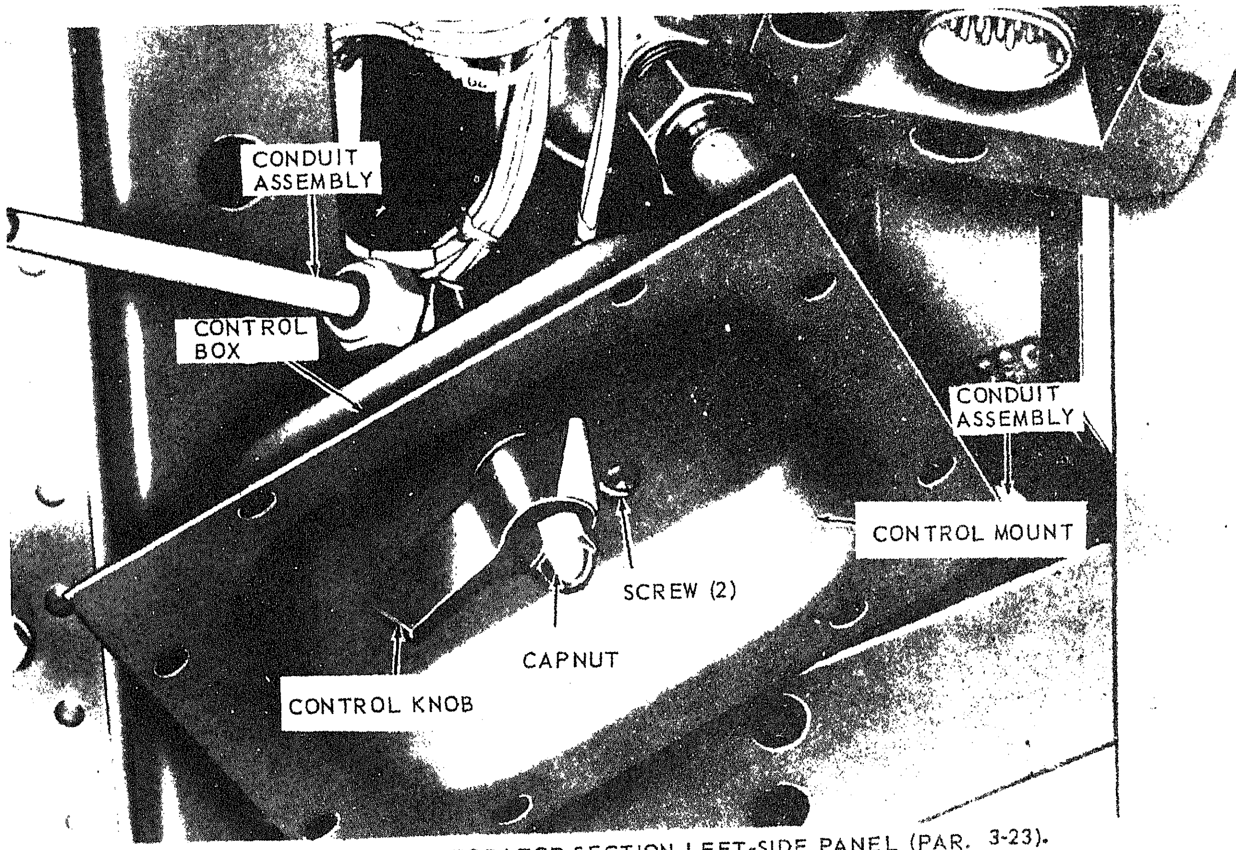
3–28. Condenser Assembly

a. Remove condenser section rear and righ side panels (para 3–23).

b. Clean accumulated dust and dirt from t core fins of the condenser assembly and su cooler with compressed air. Direct the ai stream through the fins from the inside.

***Caution:* Use only compressed air to clea condenser and subcooler. Brushing may da age fins causing partial obstruction of norm air flow.**

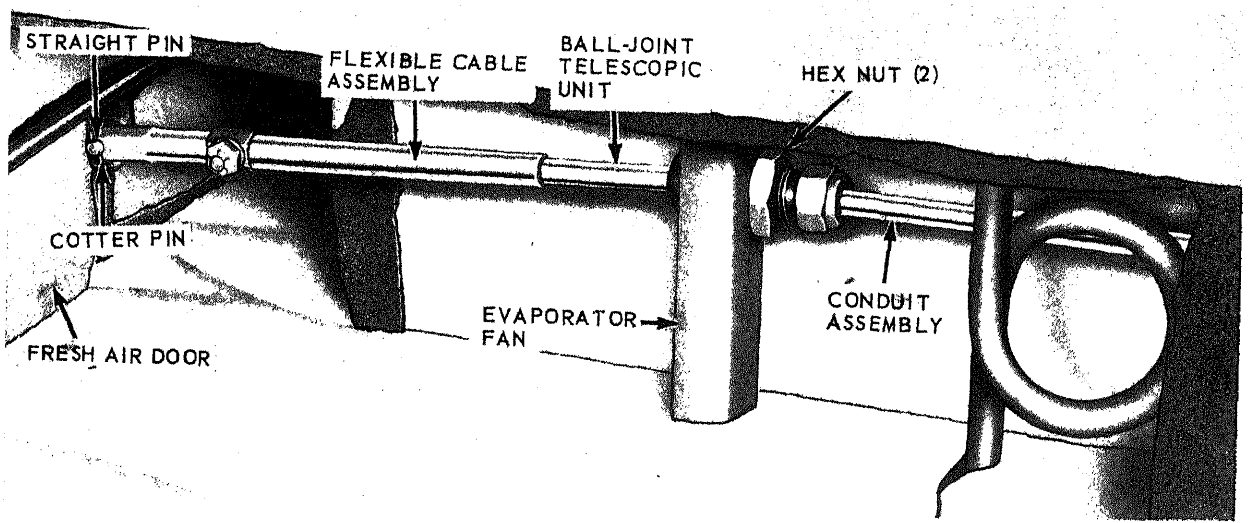
c. Install condenser section rear and righ side panels (para 3–23).



STEP 1. REMOVE EVAPORATOR SECTION LEFT-SIDE PANEL (PAR. 3-23).
STEP 2. REMOVE CAPNUT, FLATWASHER, SETSCREW AND CONTROL KNOB FROM CONTROL BOX.
STEP 3. REMOVE TWO HEX NUTS, FOUR FLAT WASHERS, AND TWO SCREWS AND REMOVE CONTROL MOUNT FROM CONTROL BOX.
STEP 4. DISCONNECT CONDUIT ASSEMBLY AND PULL CONTROL BOX WITH ATTACHED CONDUIT ASSEMBLIES OFF CABLE ASSEMBLY AND REMOVE CONDUIT ASSEMBLIES FROM CONTROL BOX.

MEC 4120-210-15/3-6 ①

Figure 3–6. Fresh air inlet door control assembly, removal, disassembly, reassembly, and installation.



STEP 5. REMOVE COTTER PIN AND STRAIGHT PIN THAT SECURE FLEXIBLE CABLE ASSEMBLY TO FRESH AIR DOOR.
STEP 6. REMOVE CABLE ASSEMBLY FROM BALL-JOINT TELESCOPIC UNIT.
STEP 7. REMOVE CONDUIT ASSEMBLY FROM BALL-JOINT TELESCOPIC UNIT AND BODY CONNECTOR. (NOT SHOWN.)
STEP 8. REMOVE TWO HEX NUTS THAT SECURE BALL-JOINT TELESCOPIC UNIT IN EVAPORATOR FRAME AND REMOVE BALL-JOINT TELESCOPIC UNIT.
STEP 9. REMOVE CURVED CONDUIT ASSEMBLY FROM TWO BODY CONNECTORS IN EVAPORATOR FRAME.
STEP 10. REMOVE TWO HEX NUTS AND LOCKWASHERS AND REMOVE TWO BODY CONNECTORS FROM EVAPORATOR FRAME.

MEC 4120-210-15/3-6 ②

Figure 3-6—Continued.

Section VIII. ELECTRICAL SYSTEM

3-29. General

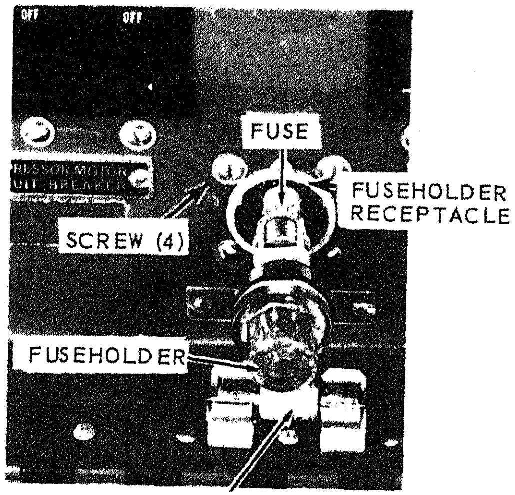
The electrical system of the air conditioners operates on a 416-volt (Model VEA4-3) or 208-volt (remaining models), 400-cycle power supply and requires a power source with a minimum output of 15 kilowatt (kw). All electrical operating switches are located on the remote control box (Models VEA4-3, VEA4-3-28029, and VEA4-3-28029MOD) or externally mounted control panel (Models VEA4-3-102103 and VEA4-3-102103MOD) and are identified as the air conditioning switch, temperature control switch, and heater selector switch. In addition, the master circuit breaker control panel contains the master circuit breaker, which acts as both a circuit breaker and a switch and must be engaged before the unit can be started. The major electrical components are the compressor and motor assembly, evaporator fan, condenser fan, and heater. The fan motors are continuous-duty type and are protected by individual circuit breakers on the master circuit breaker control panel. Plug in types of wiring harness and connectors are used throughout the electrical system.

3-30. Fuseholder Receptacle

Refer to figure 3-7 for removal and installation of fuseholder receptacle.

3-31. Remote Control Box and Cable (Models VEA4-3, VEA4-3-28029, and VEA4-3-28029MOD)

Refer to figure 3-8 for removal and installation of remote control box and cable.



NOTE: REPLACE THE SPARE FUSE AS SOON AS POSSIBLE.

STEP 1. OPEN MASTER CIRCUIT BREAKER CONTROL PANEL DOOR (FIG. 1-1).
STEP 2. REMOVE FUSE AND FUSEHOLDER (FIG. 3-3).
STEP 3. REMOVE FOUR SCREWS SECURING FUSEHOLDER RECEPTACLE TO PANEL AND PULL RECEPTACLE OUT.
STEP 4. TAG AND DISCONNECT LEADS.

MEC 4120-210-15/3-7

Figure 3-7. Fuseholder receptacle, removal and installation.

3-32. Externally Mounted Control Panel (Models VEA4-3-102103 and VEA4-3-102103MOD)

Refer to figure 3-9 for removal and installation of externally mounted control panel.

3-33. Wiring Harness, Electrical Connectors, and Plugs

Refer to figure 3-10 for removal and installation of wiring harness, electrical connectors, and plugs.

3-34. Discharge Air Thermostat

a. Removal and Installation. Refer to figure 3-11 for removal and installation of discharge air thermostat.

b. Testing.

(1) Test the heating coil of the thermostat by connecting a multimeter between the pins marked A and B o the thermostat receptacle. The resistance should measure 150 ohms (Model VEA4-3-102103MOD) or between 225 and 275 ohms (remaining models). If the resistance does not fal within the specified range, the thermostat is defective and must be replaced.

(2) Connect the multimeter between pins marked A and C. With the thermostat in an ambient temperature of 70° F there should be no continuity. If there is continuity the switch is defective and the thermostat must be replaced.

(3) Warm the thermostat by holding i over a 60-watt incandescent bulb. The contacts between pins marked A and C should close within 2 1/2 minutes and show continuity on the multimeter. If the contacts do not close with the application of heat, the switch is defective and the thermostat must be replaced.

Note. Remove thermostat from heat as soon as contacts close, or after 2 1/2 minutes. Continued heat application may damage mercury tube inside thermostat.

3-35. Return Air Thermostat (Model VEA4-3-102103MOD)

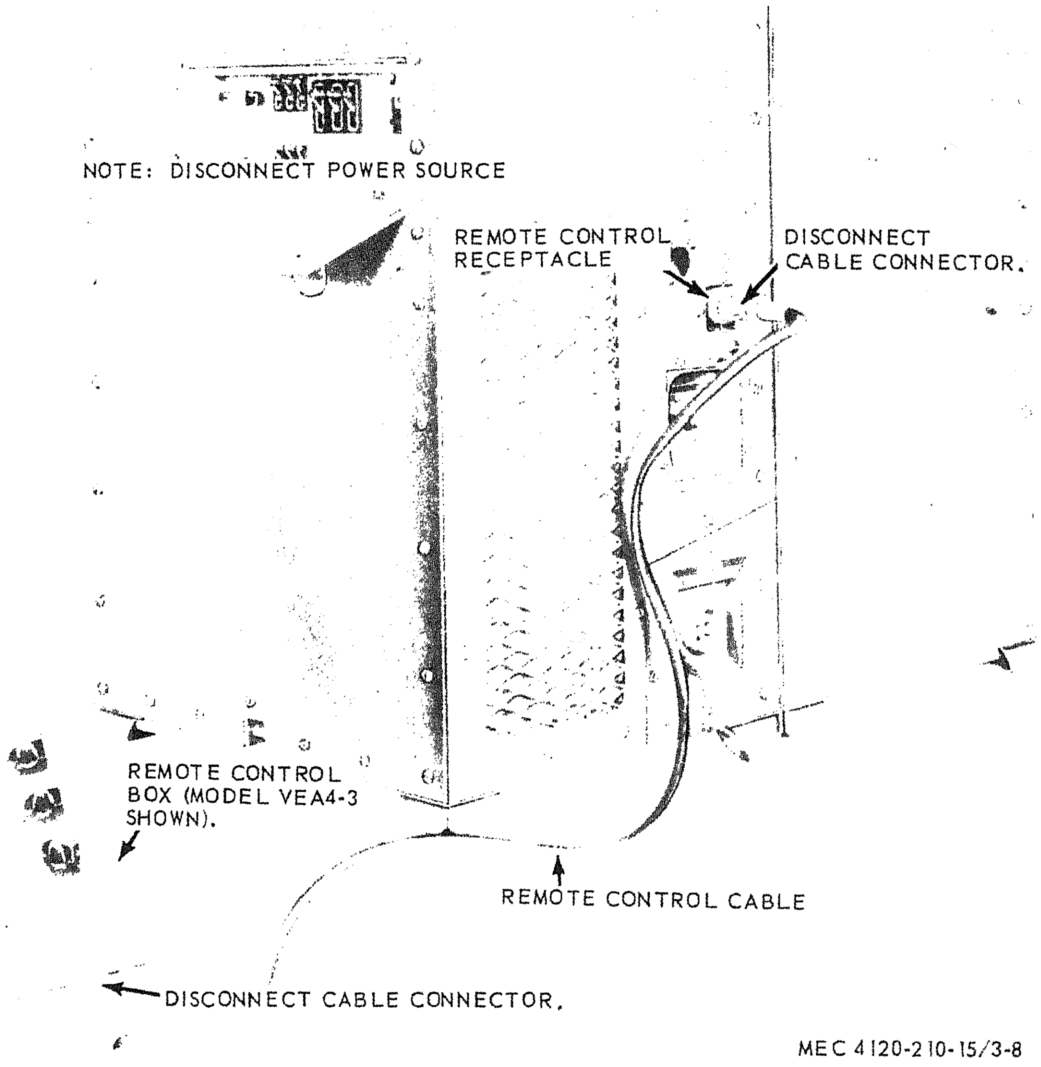
a. Refer to figure 3-12 for removal and installation of return air thermostat.

b. Refer to paragraph 3-34 and test thermostat.

3-36. Remote Control Thermostat (Models VEA4-3-28029 and VEA4-3-28029MOD)

a. Refer to figure 3-13 for removal and installation of remote control thermostat.

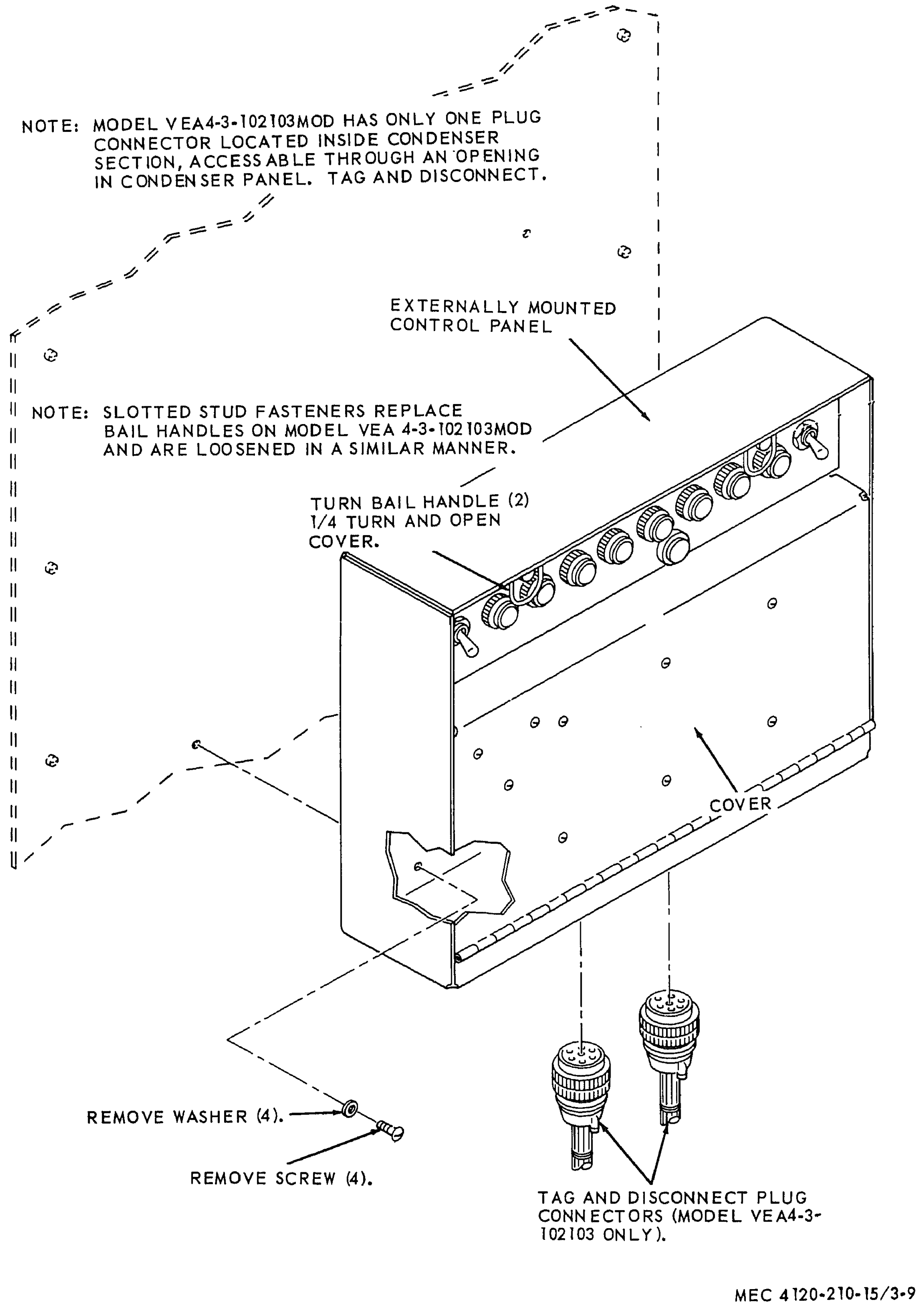
b. Refer to paragraph 3-34 and test thermostat.



NOTE: DISCONNECT POWER SOURCE

REMOTE CONTROL RECEPTACLE
DISCONNECT CABLE CONNECTOR.
REMOTE CONTROL BOX (MODEL VEA4-3 SHOWN).
REMOTE CONTROL CABLE
DISCONNECT CABLE CONNECTOR.
MEC 4120-210-15/3-8

Figure 3-8. Remote control box and cable, removal and installation (Models VEA4-3, VEA4-3-28029 and VEA4-3-28029MOD).



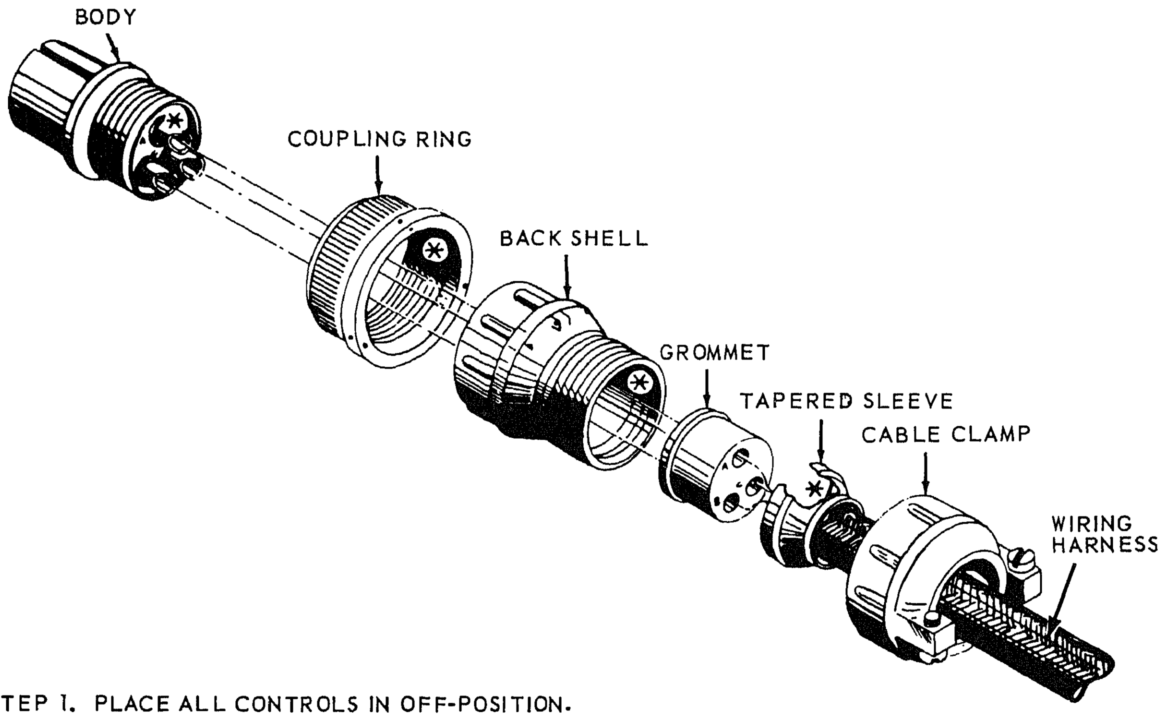
NOTE: MODEL VEA4-3-102103MOD HAS ONLY ONE PLUG CONNECTOR LOCATED INSIDE CONDENSER SECTION, ACCESSABLE THROUGH AN OPENING IN CONDENSER PANEL. TAG AND DISCONNECT.

NOTE: SLOTTED STUD FASTENERS REPLACE BAIL HANDLES ON MODEL VEA 4-3-102103MOD AND ARE LOOSENED IN A SIMILAR MANNER.

EXTERNALLY MOUNTED CONTROL PANEL
TURN BAIL HANDLE (2) 1/4 TURN AND OPEN COVER.
COVER
REMOVE WASHER (4).
REMOVE SCREW (4).
TAG AND DISCONNECT PLUG CONNECTORS (MODEL VEA4-3-102103 ONLY).
MEC 4120-210-15/3-9

Figure 3-9. Externally mounted control panel, removal and installation (Models VEA4-3-102103 and VEA4-3-102103MOD).

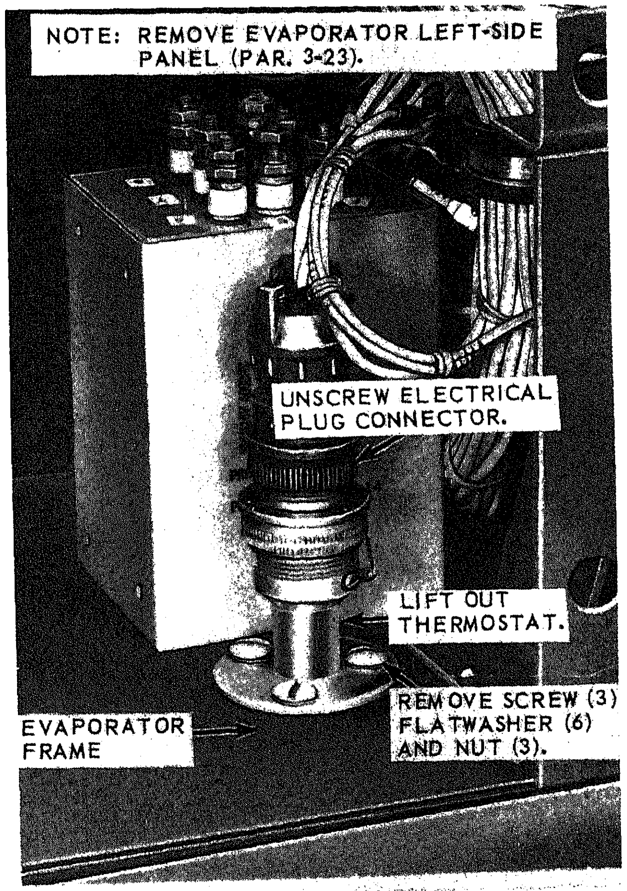
WARNING: ASSURE ALL INPUT POWER REMOVED FROM UNIT.



STEP 1. PLACE ALL CONTROLS IN OFF-POSITION.
STEP 2. REMOVE POWER SUPPLY PANEL (PAR. 3-23).
STEP 3. REMOVE CONDENSER REAR PANEL AND INSPECTION COVER (PAR. 3-23).
STEP 4. REMOVE TWO ELECTRICAL PLUGS FROM CONNECTING JACKS.
STEP 5. PULL WIRING HARNESS AS FAR OUT AS POSSIBLE.
STEP 6. SLIDE CABLE CLAMP, TAPERED SLEEVE, AND GROMMET FROM BACK SHELL.
STEP 7. APPLY SILICONE COMPOUND TO POINTS INDICATED BY * .
STEP 8. REASSEMBLE ELECTRICAL PLUGS.
STEP 9. SERVICE TWO CONNECTING JACKS AS INDICATED IN STEPS 6 AND 7 ABOVE.
STEP 10. SECURE ELECTRICAL PLUGS TO CONNECTING JACKS, REPLACE PANELS AND CONNECT POWER.

MEC 4120-210-15/3-10

Figure 3–10. Wiring harness, electrical connectors and plugs, removal and installation.



NOTE: REMOVE EVAPORATOR LEFT-SIDE PANEL (PAR. 3-23).

UNSCREW ELECTRICAL PLUG CONNECTOR.

LIFT OUT THERMOSTAT.

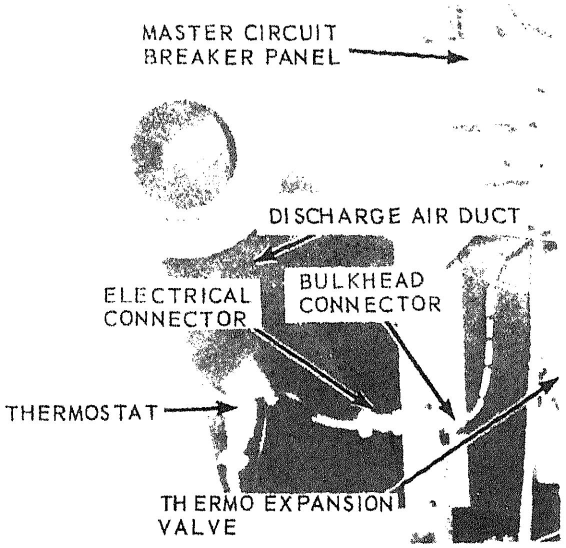
REMOVE SCREW (3) FLATWASHER (6) AND NUT (3).

MEC 4120-210-15/3-11 ①

VEA4–8, VEA4–8–102103, VEA4–8–28029, and VEA4–8–28029MOD

Figure 3–11. Discharge air thermostat, removal and installation.

NOTE: THIS THERMOSTAT IS IDENTICAL IN APPEARANCE TO RETURN AIR THERMOSTAT, BUT NOT FUNCTIONALLY INTERCHANGEABLE. BE SURE PROPER TAG IS SECURELY ATTACHED TO THERMOSTAT ON REMOVAL.



STEP 1. DISCONNECT ELECTRICAL CONNECTOR FROM THERMOSTAT.
STEP 2. REMOVE NUTS (3), WASHERS (6), SCREWS (3) AND CLAMP FROM FLANGE OF THERMOSTAT.
STEP 3. REMOVE THERMOSTAT.
STEP 4. REMOVE GASKET FROM BARREL OF THERMOSTAT.

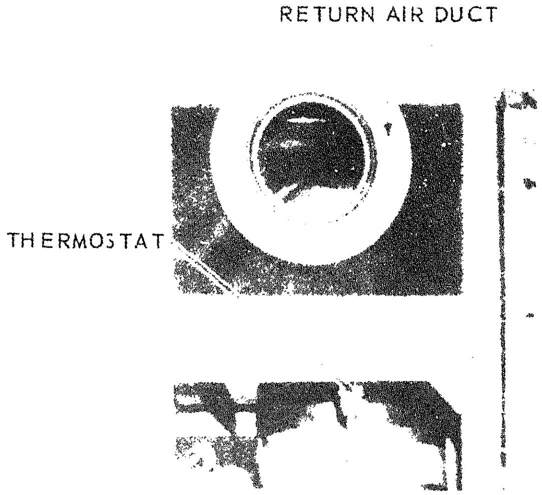
B. MODEL VEA4-3-102103MOD.

MEC 4120-210-15/3-11 ②

VEA4-3-102103MOD

Figure 3-11—Continued.

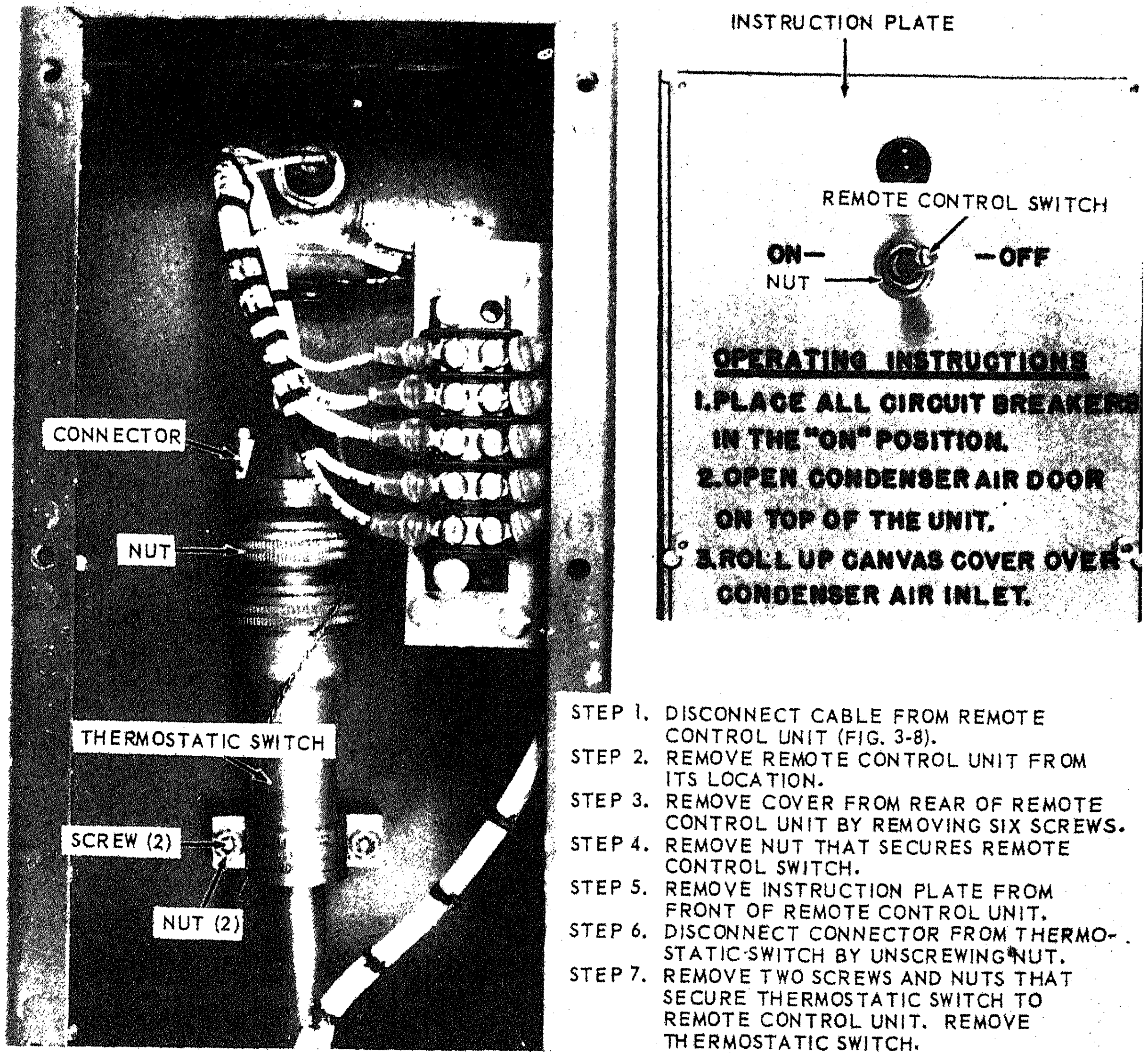
NOTE: THIS THERMOSTAT IS IDENTICAL IN APPEARANCE TO DISCHARGE AIR THERMOSTAT, BUT IS NOT FUNCTIONALLY INTERCHANGEABLE. BE SURE PROPER TAG IS SECURELY ATTACHED TO THERMOSTAT ON REMOVAL.



STEP 1. REMOVE EVAPORATOR SECTION FRONT PANEL (FIG. 3-5).
STEP 2. UNSCREW AND REMOVE ELECTRICAL CONNECTOR.
STEP 3. REMOVE SCREWS (3), WASHERS (3) AND NUTS (3) SECURING THERMOSTAT TO RETURN AIR DUCT.
STEP 4. TAG AND REMOVE THERMOSTAT, GASKET AND SPACERS (2). BE CAREFUL NOT TO DROP WASHER ON INSIDE OF AIR DUCT INTO EVAPORATOR FAN.

MEC 4120-210-15/3-12

Figure 3-12. Return air thermostat, removal and installation.


INSTRUCTION PLATE
REMOTE CONTROL SWITCH
ON—
—OFF
NUT
OPERATING INSTRUCTIONS
1. PLACE ALL CIRCUIT BREAKERS IN THE "ON" POSITION.
2. OPEN CONDENSER AIR DOOR ON TOP OF THE UNIT.
3. ROLL UP CANVAS COVER OVER CONDENSER AIR INLET.
CONNECTOR
NUT
THERMOSTATIC SWITCH
SCREW (2)
NUT (2)

STEP 1. DISCONNECT CABLE FROM REMOTE CONTROL UNIT (FIG. 3-8).
STEP 2. REMOVE REMOTE CONTROL UNIT FROM ITS LOCATION.
STEP 3. REMOVE COVER FROM REAR OF REMOTE CONTROL UNIT BY REMOVING SIX SCREWS.
STEP 4. REMOVE NUT THAT SECURES REMOTE CONTROL SWITCH.
STEP 5. REMOVE INSTRUCTION PLATE FROM FRONT OF REMOTE CONTROL UNIT.
STEP 6. DISCONNECT CONNECTOR FROM THERMOSTATIC SWITCH BY UNSCREWING NUT.
STEP 7. REMOVE TWO SCREWS AND NUTS THAT SECURE THERMOSTATIC SWITCH TO REMOTE CONTROL UNIT. REMOVE THERMOSTATIC SWITCH.

NOTE: MODEL VEA4-3-28029MOD HAS A 3-POSITION ROTARY SWITCH IN PLACE OF REMOTE CONTROL TOGGLE SWITCH. REMOVE ROTARY SWITCH SELECTOR KNOB BEFORE PERFORMING STEP 6.

MEC 4120-210-15/3-13

Figure 3–13. Remote control thermostat, removal and installation.

CHAPTER 4

DIRECT AND GENERAL SUPPORT AND DEPOT MAINTENANCE INSTRUCTIONS

Section I. GENERAL

4–1. Scope

a. The following instructions are for direct and general support and depot maintenance personnel. They contain information on equipment maintenance that is beyond the scope of the tools, equipment, personnel, or supplies normally available to organizational maintenance.

b. Appendix A includes the publications applicable to direct and general support and depot maintenance. Appendix B contains the maintenance allocation chart. The direct and general support and depot maintenance repair parts and special tool lists are listed in TM 5–4120–210–25P.

4–2. Record and Report Forms

For record and report forms applicable to direct and general support and depot maintenance, refer to TM 38–750.

Note. Applicable forms, excluding standard Form 46 which is carried by the operator, will be kept in a canvas bag mounted on the equipment.

Section II. DESCRIPTION AND TABULATED DATA

4–3. Description

For a complete description of the air conditioners, see paragraph 1–2.

4–4. Tabulated Data

a. Condenser.

Manufacturer	Trane Company
Model	A902–7791

b. Evaporator.

Manufacturer	Trane Company
Model	A902–7790

c.– Pressure Relief Valve.

Manufacturer	Circle Seal Co.
Relief pressure	350 psi

d. Liquid Quench Valve.

Manufacturer	Alco Valve Co.
Type	DT 7838–1
Capacity	2 tons

e. Thermoexpansion Valve.

Manufacturer	Alco Valve Co.
Type	DT 8591 18FGS
Capacity	4 tons

f. Power Transformer.

Manufacturer	Microtran Company
Primary volts (Model VEA4–3).	416
Primary volts (remaining models)	208
Secondary volts (Model VEA4–3).	60.4 center tapped (ct)
Secondary volts (remaining models).	30.2 ct

g. Time Delay Relay.

Manufacturer	Dialtron Corp.
Style	FR
Volts	28
Delay Time	3 seconds

h. Motor Control Relay (Model VEA4–3).

Manufacturer	Leach Relay Co.
Type	9071
Volts	416
Amperes	25
Frequency	400 cps
Coil volts	24/28

i. High-Pressure Cutout Switch.

Manufacturer	Custom Component Switches, Inc.
Volts	28
Amperes	2
Range	230 to 260 ± 10 psi

j. Heater Control Relay (Model VEA4-3).

Manufacturer	Leach Relay Co.
Type	9071
Volts	416
Amperes	25
Frequency	400 cps
Coil volts	24/28

k. Interlock Relay.

Manufacturer	Potter and Brumfield
Volts	24

l. Nut and Bolt Torque Data.

Table 4-1. Torque Requirements

Tube size OD	Nut size	Aluminum tubing		Steel tubing	
		Minimum	Maximum	Minimum	Maximum
0.250	9/16 in.	40	60	135	150
0.375	11/16 in.	150	200		
0.500	7/8 in.	250	350		
0.625	1 in.	200	350	350	400
0.750	1 1/4 in.	300	500	350	400

Compressor motor rotor shaft nut.	20 foot pounds (ft-lb)
Compressor motor rotor shaft cap.	8 ft-lb

m. Capacities.

(1) *Model VEA4-3-, VEA4-3-102103, and VEA4-3-102103MOD.*

Compressor	500 cc refrigerant compressor lubricant oil RCO-3 (FSN 9150-265-7301).
Refrigerant	Refrigerant-12 (FSN 6830-292-0147) 25-lb cylinder.

(2) *Models VEA4-3-28029 and VEA4-3-28029MOD.*

Compressor	500 cc refrigerant compressor lubricant oil RCO-3 (FSN 9150-265-7301).
Refrigerant	Refrigerant-12 (FSN 6830-292-0147) 25-lb cylinder.

n. Time Standards. Table 4-2 lists the number of man-hours required under normal conditions to perform the indicated maintenance and repair for the air conditioners. Components are listed under the appropriate functional index. The times listed are not intended to be rigid standards. Under adverse conditions, the operations will take longer; but under ideal conditions with highly skilled mechanics, most of the operations can be accomplished in considerably less time.

Table 4-2. Time Standards

		Man-hours
15	FRAME	
1501	Frame Assembly	
	Frame, evaporator section (includes removal and installation of evaporator, heater control assembly, motor control assembly, temperature control box, rectifier and power transformer, circuit breakers)	30
	Frame, condenser section (includes R and I of purge, drain, charge valves, oil separator, condenser, subcooler, compressor, relief valve, condenser fan, tubing and hose assemblies)	22
18	BODY CAB, HOOD HULL	
1801	Body, Cab, Hood, Hull Assemblies	
	Cable, control, fresh air	1.0
	Panels	0.2
	Panels, evaporator right side and condenser left side (Includes discharging refrigerant system, disconnecting refrigerant tubing, recharge refrigerant system.)	2.5
	Insulation	0.7
33	SPECIAL PURPOSE KIT	
3303	Winterization Kit	
	Wiring harness	1.0
	Thermostat	0.7
	Motor, fan	0.9
	Circuit breaker; switches; fan (ea)	0.5
40	ELECTRIC MOTORS	
4000	Motor, Compressor (includes R and I of oil tube assemblies, wiring, outlet tube assembly, discharging and recharging system)	5.8
	Motors, evaporator and condenser (includes R and I of panels)	1.0
4001	Rotor Assemblies	
	Rotors (motor removed from unit)	1.5
4002	Stator Assemblies	
	Stator (motor removed from unit)	1.8
4005	Frame support and housing	
	Bearings (Motor out of unit)	2.0
4010	Auxiliary Control Assembly	
	Control, Remote	0.3
4018	Terminal Block, Junction Boxes	
	Connectors	0.5
	Plugs	0.5
	Receptacle, remote control	0.7
42	ELECTRICAL EQUIPMENT	
4202	Electrical Controls	
	Control assembly heater and motor (includes R and I of panels, plug connectors)	3.5
4203	Circuit Breakers, Cutout Devices, Fuse and Fush Holder	
	Circuit breakers	0.7
	Holder, fuse	0.5
	Fuse	0.1
	Switches; relays	0.7
4205	Control resistance	
	Rheostat, remote control	0.8
4213	NONROTATING RECTIFIER	
	Rectifier (includes R and I of evaporator fan assy, wiring, and panels)	1.5
	Transformer (includes R and I of evaporator fan assy, wiring, and panels)	1.5
4216	Miscellaneous Wiring and Fittings	
	Wiring harness	8.0
	Receptacles	0.7
52	AIR CONDITIONING	
5200	Gas Compressor Assembly	
	Compressor (includes R and I of panels, wiring, tubing, discharge refrigerant systems)	2.0
5216	Oil Piping	
	Tube Assembly (includes R and I of panels, discharging and charging refrigerant system)	2.5
	Sight Glass (includes R and I of panels, discharging system)	
5217	Refrigerant Piping	
	Tube assembly	2.5
	Valves (ea)	2.0
5228	Oil Separator	
	Oil separator (includes R and I of panels, discharging system)	1.6
5230	Condenser	
	Condenser (includes R and I of panels, subcooler, purge valve, and discharging system)	4.5
	Subcooler	2.5
5241	Evaporator	
	Evaporator assembly (includes R and I of panels and heater assembly)	4.5
5243	Blower Assembly	
	Fan assembly	1.3
5244	Thermostatic Controls	
	Thermostat	0.8
5245	Air Filters	
	Filters, air	0.3
5247	Heating Units	
	Heater assembly (includes R and I of panels, wiring)	2.0
	Manifolds	2.5

o. Wiring Diagram. Refer to figure 4-1 for the wiring diagrams.

p. Refrigerant System Flow Chart and Diagram. Refer to figure 4-2 for the refrigerant system flow chart and diagram.

Model VEA4-3

Figure 4-1. Wiring diagram.

(Located in back of manual)

Models VEA4-3-102103 and VEA4-3-102103MOD

Figure 4-1—Continued.

(Located in back of manual)

Models VEA4-3-102103 and VEA4-3-102103MOD—Continued

Figure 4-1—Continued.

(Located in back of manual)

Models VEA4-3-102103 and VEA4-3-102103MOD—Continued

Figure 4-1—Continued.

(Located in back of manual)

Models VEA4-3-102103 and VEA4-3-102103MOD—Continued

Figure 4-1—Continued.

(Located in back of manual)

Models VEA4-3-102103 and VEA4-3-102103MOD—Continued

Figure 4-1—Continued.

(Located in back of manual)

Models VEA4-3-28029 and VEA4-3-28029MOD

Figure 4-1—Continued.

(Located in back of manual)

Models VEA4-3-28029 and VEA4-3-28029MOD—Continued

Figure 4-1—Continued.

(Located in back of manual)

Models VEA4-3-28029 and VEA4-3-28029MOD—Continued

Figure 4-1—Continued.

(Located in back of manual)

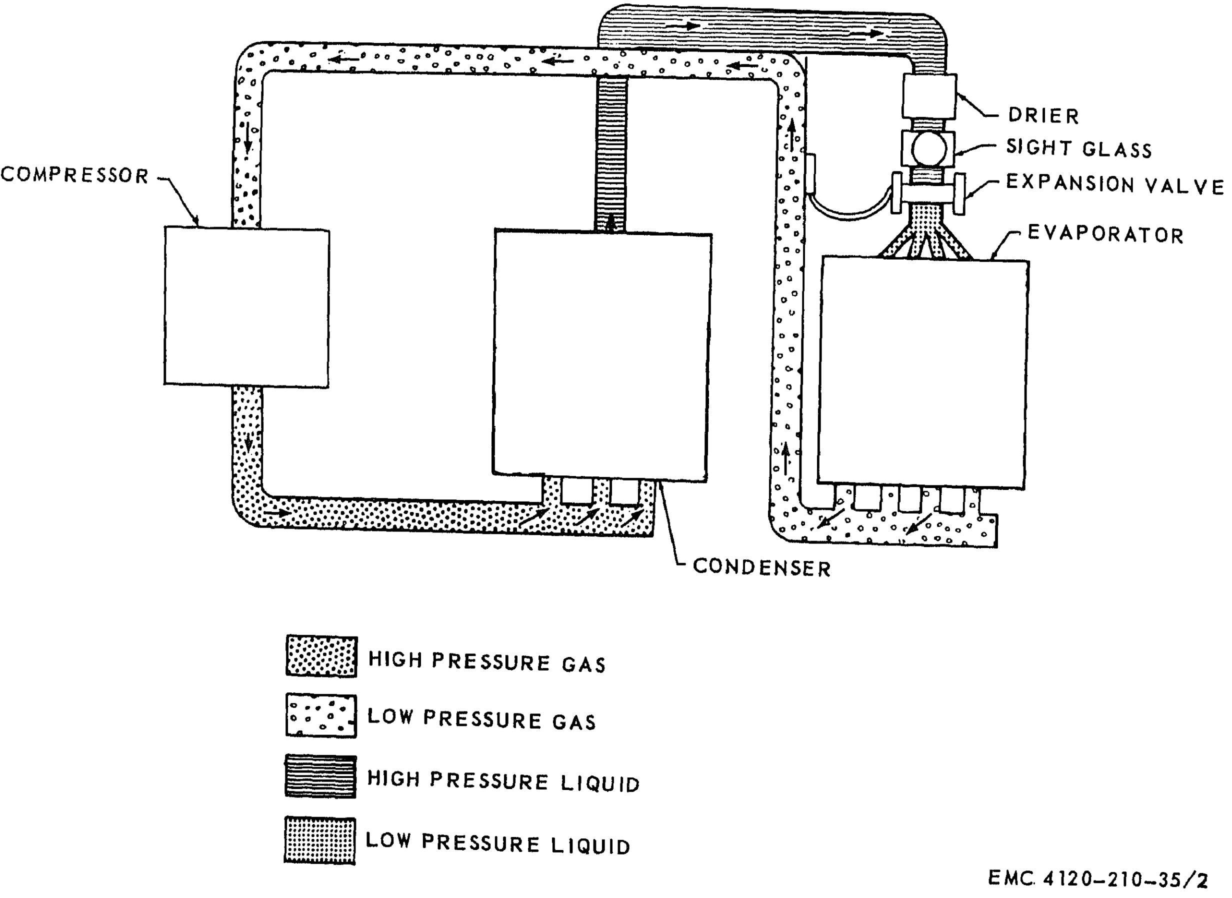
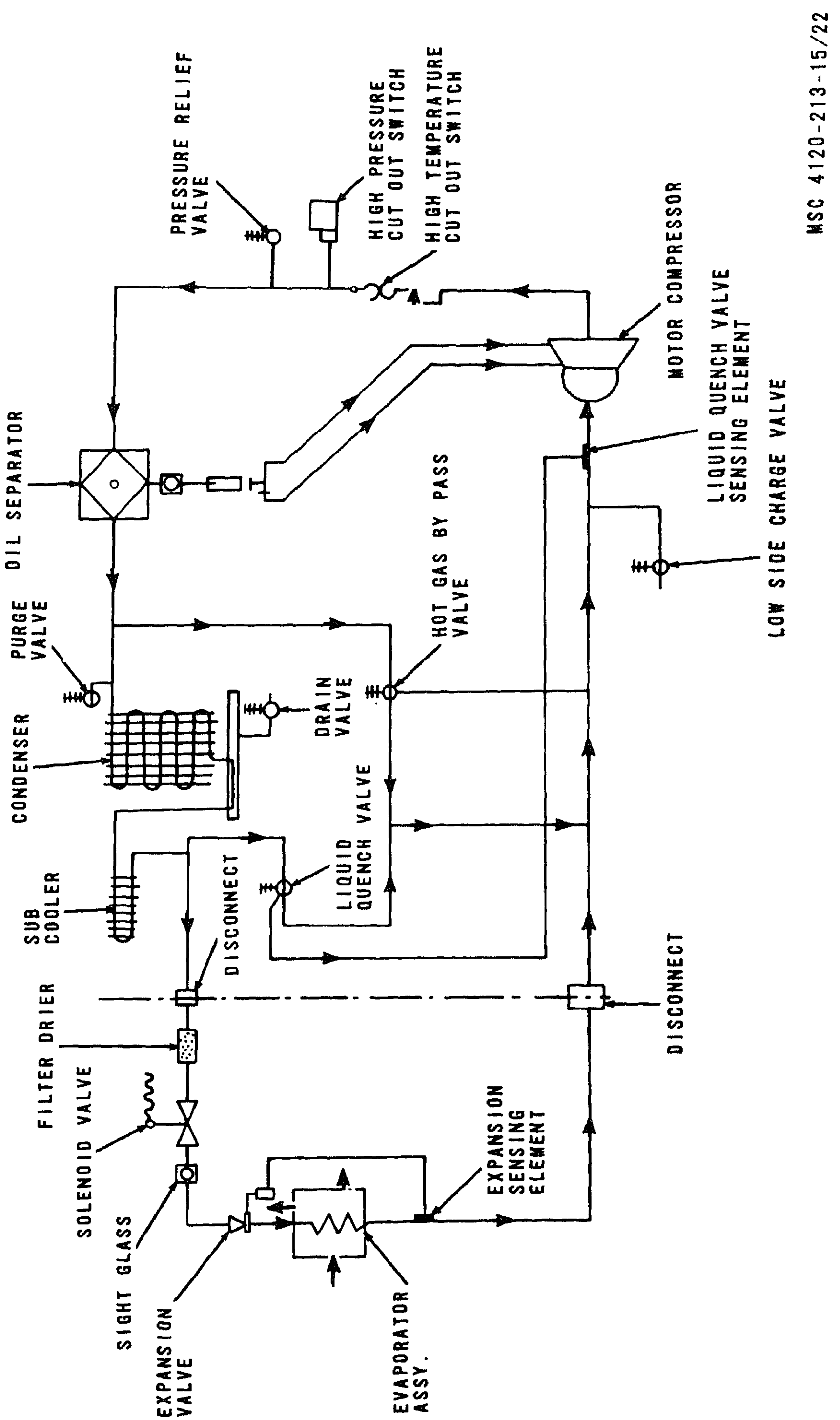


Figure 4–2. Refrigerant system flow chart and diagram.



Section III. SPECIAL TOOLS AND EQUIPMENT

4-5. Special Tools and Equipment

No special tools or equipment are required to perform direct and general support and depot maintenance on the air conditioners.

4-6. Direct and General Support and Depot Maintenance Repair Parts

Direct and general support and depot maintenance repair parts are listed and illustrated in TM 5-4120-210-25P.

4-7. Specially Designed Tools and Equipment

No specially designed tools or equipment are required to perform direct and general support and depot maintenance on the air conditioners.

Section IV. TROUBLESHOOTING

4-8. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the air conditioners or any of their components. Each trouble symptom stated is followed by a list of probable causes of trouble. The possible remedy recommended is described opposite the probable cause.

4-9. Air Conditioner Fails To Start

Probable cause	Possible remedy
Power supply wiring harness assembly defective.	Replace power supply wiring harness assembly (para 3-33).
Master circuit breaker defective.	Replace master circuit breaker (para 4-60).
Power transformer windings open or shorted.	Replace power transformer (para 4-57).
Rectifier defective	Replace rectifier (para 4-57).
Microswitch defective	Replace microswitch (para 4-56).
Defective unit power switch.	Test for open switch. Replace defective switch (para 4-46, 4-57, or 4-48.
Defective relays	Test relays for open or short. Replace defective relays para 4-47 or 4-48).

4-10. Air Conditioner Stops Suddenly

Probable cause	Possible remedy
Transformer windings open or shorted.	Replace power transformer (para 4-57).
Rectifier open or shorted	Replace rectifier (para 4-57).
Power supply wiring harness open or shorted.	Replace power supply wiring harness assembly (para 3-33).
Master circuit breaker defective.	Replace master circuit breaker (para 4-60).
Microswitch defective	Replace microswitch (para 4-56).
Air conditioning switch defective.	Replace air conditioning switch (para 4-46, 4-47, or 4-48).

4-11. Heating Insufficient

Probable cause	Possible remedy
Tubular heater defective	Replace tubular heaters as required (para 4-59).
Heater-to-bulkhead wiring harness assembly defective.	Replace wiring harness assembly (para 4-58).
Heater control-to-bulkhead wiring harness assembly open or shorted.	Replace wiring harness assembly (para 4-58).
Heater control relay coil open or shorted.	Replace heater control relay (para 4-51).
Heater circuit breaker defective.	Replace heater circuit breaker (para 4-60).
Time delay relay defective	Replace time delay relay (para 4-51).
Heater selector switch defective.	Replace heater selector switch (para 4-46, 4-47, or 4-48).
Defective heating control variable resistor.	Test. Replace defective variable resistor (para 4-48).

4-12. Cooling Insufficient

Probable cause	Possible remedy
Refrigerant charge low	Check for leaks and repair same (para 4-24). Purge and charge refrigerant system (para 4-26).
Filter-drier clogged	Replace filter-drier (para 4-27).
Air and noncondensable gases in the refrigerant system.	Purge and charge refrigerant system (para 4-26).
Hot gas bypass valve defective.	Replace hot gas bypass valve (para 4-33 or 4-34).
Thermoexpansion valve inoperative.	Replace thermoexpansion valve (para 4-38).
Solenoid valve coil open or shorted.	Replace solenoid valve coil (para 4-37).
Defective fuse	Replace fuse (para 3-8).
Defective cooling control variable resistor.	Test. Replace defective cooling control variable resistor (para 4-48).
High temperature cutout switch defective.	Test. Replace defective switch (para 4-54).
Defective rectifiers, CR-1 through CR-4.	Test (para 4-57). Replace defective rectifiers.
Defective liquid quench valve.	Replace liquid quench valve (para 4-32).
Defective evaporator	Replace condenser (para 4-39).
Defective condenser	Replace condenser (para 4-36).
Defective subcooler	Replace subcooler (para 4-36).
Defective oil filter	Replace oil filter (para 4-28).
Defective oil separator	Replace oil separator (para 4-32).
Defective transformer	Test for open or shorted transformer (para 4-57). Replace transformer if necessary.
Defective relays K111, K112, K113, or K107.	Test relays for opens or shorts. Replace defective relay (para 4-47).
Defective time delay relay	Test relay for opens or shorts. Replace if necessary (para 4-47).
Defective circuit breaker in circuit breaker panel.	Test circuit breaker (para 4-60). Replace if necessary.

4-13. Motor Compressor Assembly Excessively Noisy

Probable cause	Possible remedy
Oil charge low	Add compressor oil (para 4-29)
Thermoexpansion valve defective.	Replace thermoexpansion valve (para 4-38).
Motor compressor assembly defective.	Replace or repair motor compressor assembly (para 4-29).
Liquid quench valve defective.	Replace liquid quench valve (para 4-32).
Oil filter assembly clogged	Clean oil filter assembly (para 4-28).
Oil separator defective	Replace oil separator (para 4-32).

4-14. Cooling Excessive

Probable cause	Possible remedy
Variable resistor defective	Replace the variable resistor (para 4-48).
Solenoid valve stuck open or leaking.	Replace solenoid valve (para 4-37).

4-15. Compressor Motor Inoperative

Probable cause	Possible remedy
Compressor motor defective	Replace motor compressor (para 4-29).
Motor control-to-compressor wiring harness open or shorted.	Replace motor control-to-compressor wiring harness (para 4-58).
High temperature cutout switch defective	Replace high-temperature cutout switch (para 4-54).
High pressure cutout switch defective.	Replace the high-pressure cutout switch (para 4-55).
Compressor motor control relay coil open or shorted.	Replace compressor motor control relay (para 4-52).
Time delay relay defective	Replace time delay relay (para 4-52).
Compressor motor stator windings open or shorted.	Replace compressor motor stator (para 4-29).
Compressor motor temperature limit switch defective.	Replace compressor motor stator (para 4-29).
Compressor internal parts broken or excessively worn.	Replace compressor motor (para 4-29).

4-16. Evaporator Fan Motor Inoperative

Probable cause	Possible remedy
Evaporator fan motor defective.	Repair or replace evaporator fan motor (para 4-41).
Evaporator fan circuit breaker defective.	Replace evaporator fan circuit breaker (para 4-60).
Motor control-to-components wiring harness open or shorted.	Replace wiring harness (para 4-58).
Evaporator fan motor control relay coil open or shorted.	Replace evaporator fan motor control relay (para 4-52).
Evaporator fan reset switch defective.	Replace evaporator fan reset switch (para 4-52)
Temperature limit switch defective.	Replace temperature limit switch (para 4-41).
Evaporator fan motor stator windings open or shorted.	Repair or replace evaporator fan motor stator (para 4-41).

4-17. Condenser Fan Motor Inoperative

Probable cause	Possible remedy
Condenser fan motor defective	Repair or replace condenser fan motor (para 4-42).

Probable cause	Possible remedy
Condenser fan circuit breaker defective.	Replace condenser fan circuit breaker (para 4-60).
Condenser compartment wiring harness open or shorted.	Replace wiring harness (para 4-58).
Time delay relay defective	Replace time delay relay (para 4-52).
Condenser fan motor control relay coil open or shorted.	Replace condenser fan motor control relay (para 4-52).
Temperature limit switch defective.	Replace temperature limit switch (para 4-41).
Condenser fan motor stator or windings open or shorted.	Repair or replace condenser fan motor stator (para 4-42).

4-18. Compressor Stops of High Head Pressure

Probable cause	Possible remedy
Air and noncondensable gases in refrigerant system.	Purge and charge refrigerant system (para 4-26).
Overcharge of refrigerant	Purge and charge refrigerant system (para 4-26).
High-pressure cutout switch defective.	Replace high-pressure cutout switch (para 4-55).

4-19. Compressor Stops of High Discharge Temperature

Probable cause	Possible remedy
Refrigerant charge low	Purge and charge refrigerant system (para 4-26).
Air and noncondensable gases in refrigerant system.	Purge and charge refrigerant system (para 4-26).
Liquid quench valve defective.	Replace liquid quench valve (para 4-32).
Hot gas bypass valve defective.	Replace hot gas bypass valve (para 4-33 or 4-34).
High-temperature cutout switch defective.	Replace high-temperature cutout switch (para 4-54).

4-20. Master Circuit Breaker Continues to Trip

Probable cause	Possible remedy
Master circuit breaker defective.	Replace master circuit breaker (para 4-60).
Power supply wiring harness shorted.	Replace power supply wiring harness (para 4-58).
Wiring harness in motor control shorted.	Replace wiring harness (para 4-58).

Section V. HOUSING PANELS

4-21. General

Removal of the condenser section right side panel and the evaporator section left side panel requires disconnection and separation of the two sections which necessitates breaking refrigerant lines and subsequent servicing procedures which are covered in section VI. For a general description of the housing panels, refer to paragraph 3-22.

4-22. Connecting Side Panels

a. Removal.

(1) Remove the housing panels (para 3-23).

(2) Discharge the refrigerant system (para 4-26).

(3) Refer to figure 4-3 and separate the evaporator section from the condenser section and remove the connecting side panels.

b. Disassembly and Reassembly. Refer to figure 4-4 and disassemble and reassemble the housing panels.

c. Installation.

(1) Refer to figure 4-3 and install the connecting side panels and connect the evaporator and condenser sections.

(2) Charge and purge the refrigerant system (para 4-26).

(3) Install the housing panels (para 3-23).

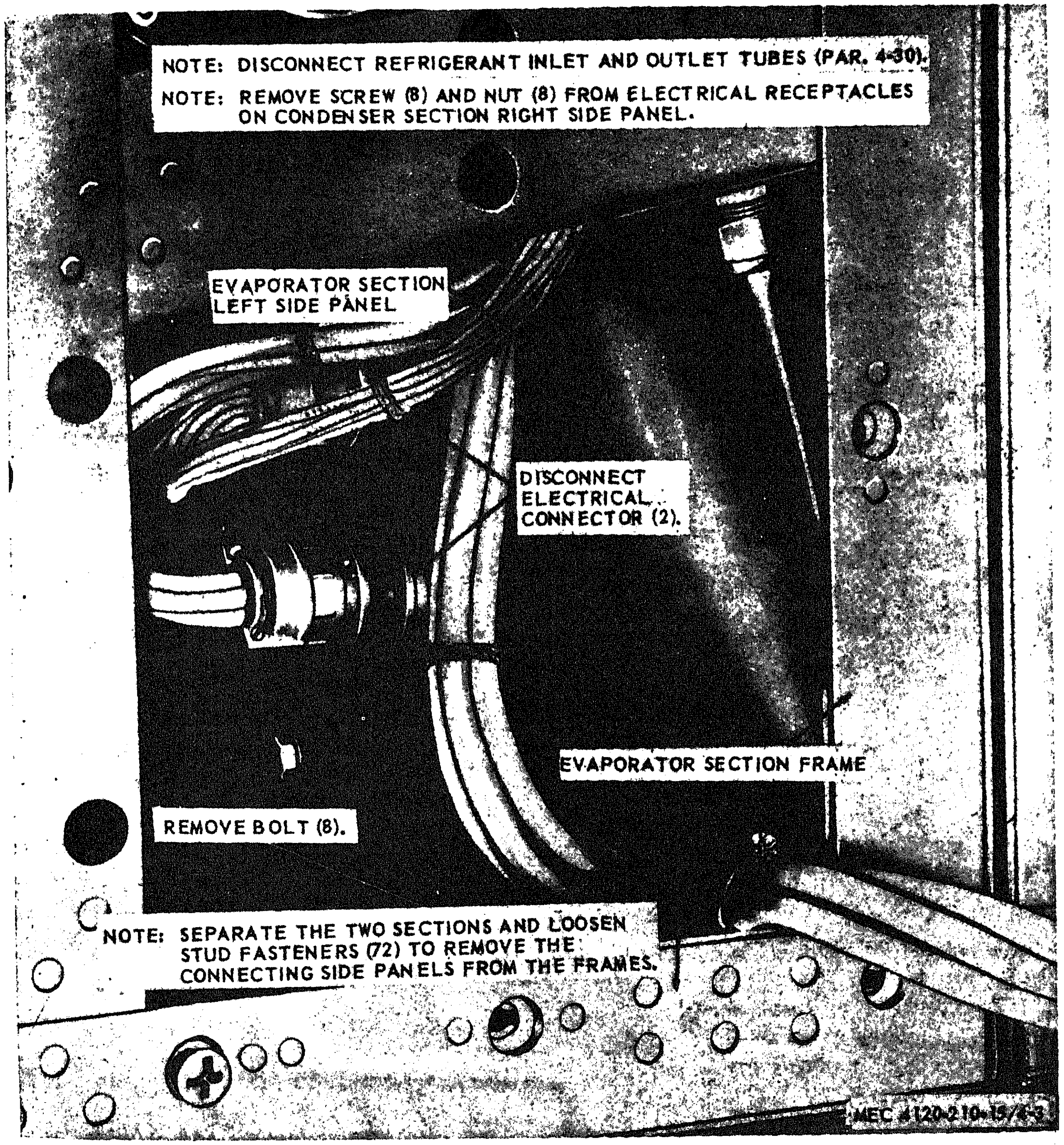
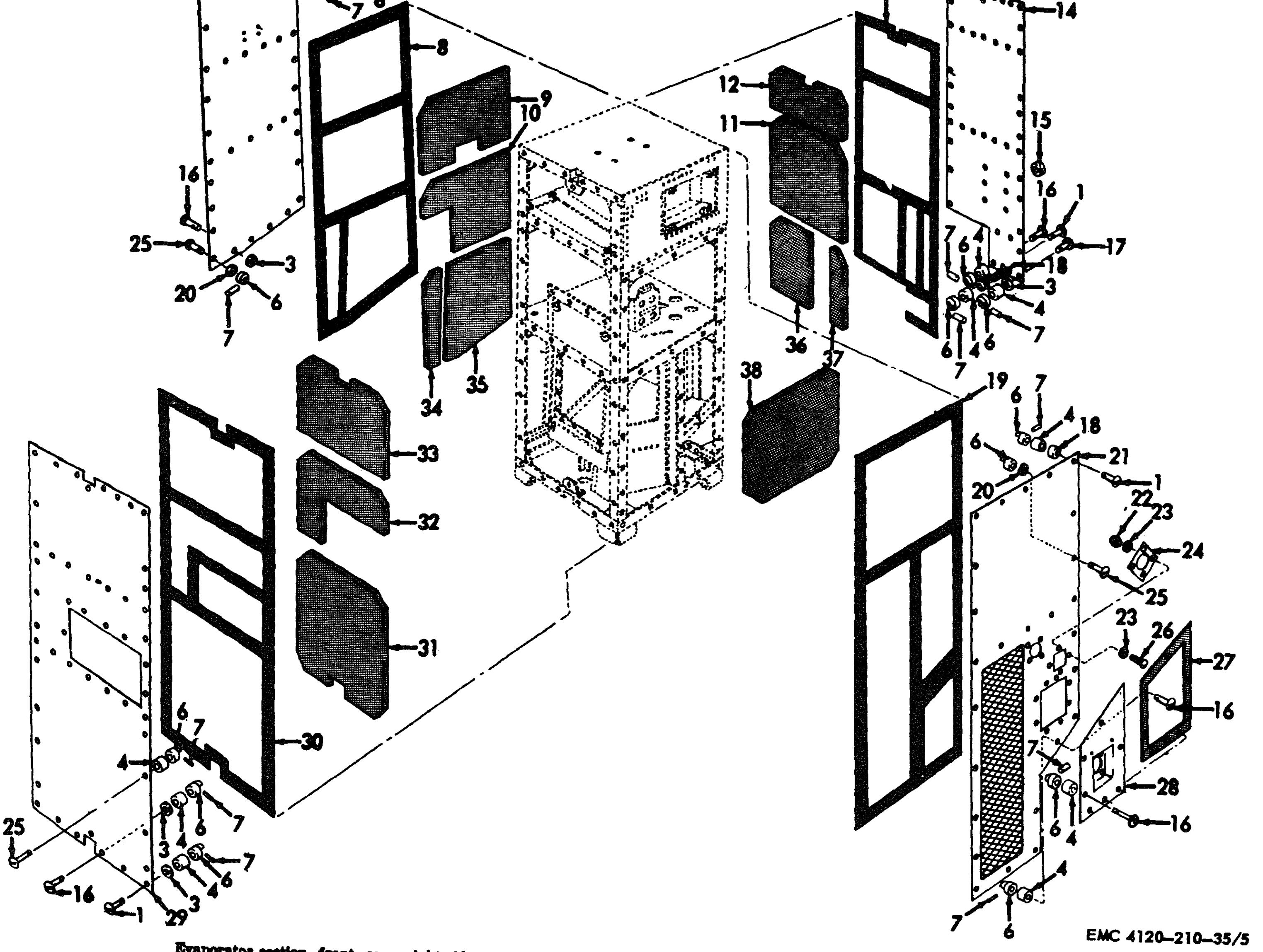

NOTE: DISCONNECT REFRIGERANT INLET AND OUTLET TUBES (PAR. 4-30).
NOTE: REMOVE SCREW (8) AND NUT (8) FROM ELECTRICAL RECEPTACLES ON CONDENSER SECTION RIGHT SIDE PANEL.
EVAPORATOR SECTION LEFT SIDE PANEL
DISCONNECT ELECTRICAL CONNECTOR (2).
EVAPORATOR SECTION FRAME
REMOVE BOLT (8).
NOTE: SEPARATE THE TWO SECTIONS AND LOOSEN STUD FASTENERS (72) TO REMOVE THE CONNECTING SIDE PANELS FROM THE FRAMES.
MEC 4120-210-15/4-3

Figure 4-3. Evaporator and condenser sections disconnecting points and connecting side panels, removal and installation.

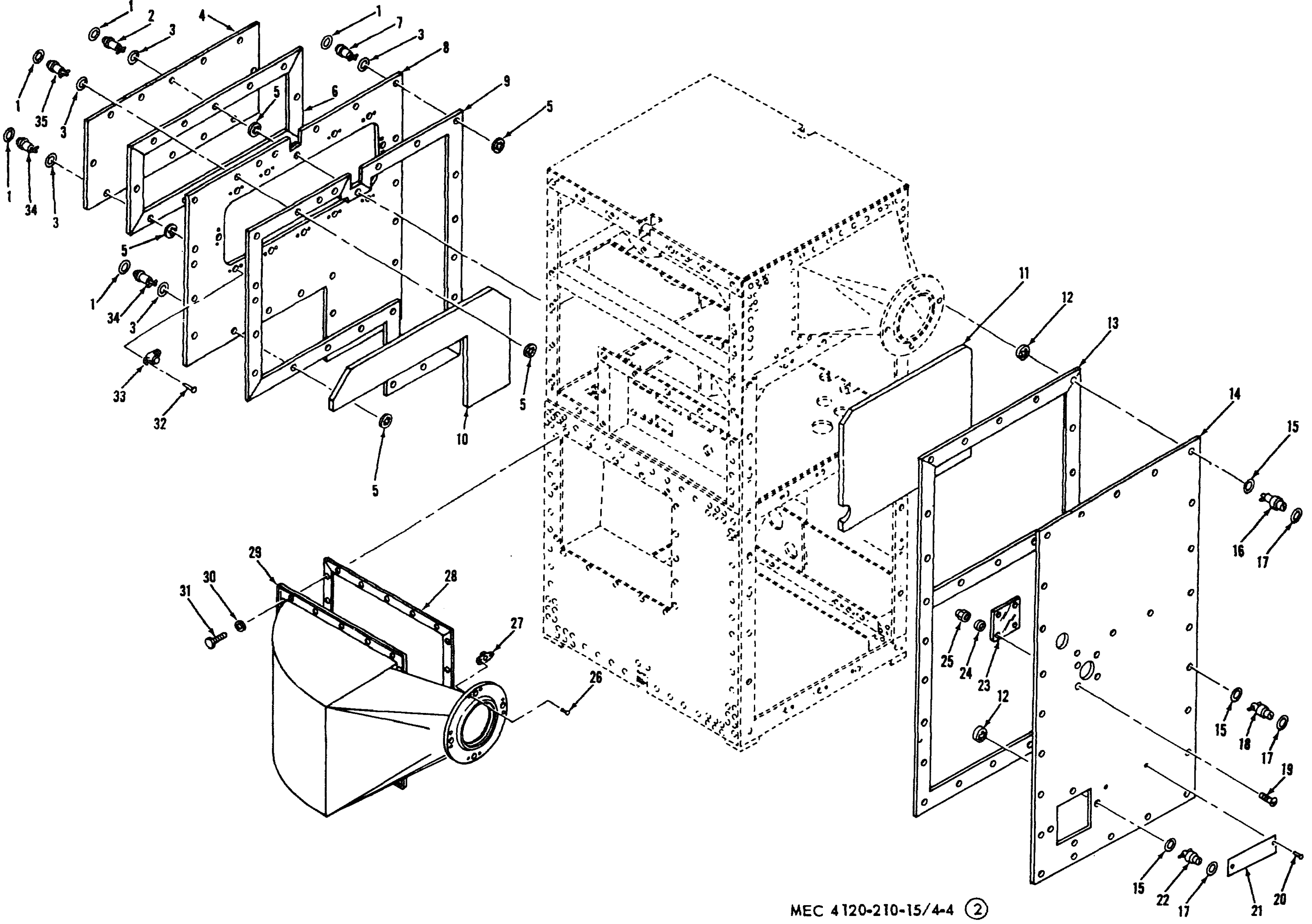


Evaporator section, front, rear, right-side and left-side panels, Models VEA4-3, VEA4-3-28029, and VEA4-3-28029MOD

Figure 4-4. Housing panels, disassembly and reassembly.

1	Stud (as rqr)
2	Panel
3	Spacer (92 rqr)
4	Sleeve (154 rqr)
5	Spacer (6 rqr)
6	Cam (154 rqr)
7	Pin (154 rqr)
8	Gasket
9	Rubber insulation
10	Rubber insulation
11	Rubber insulation
12	Rubber insulation
13	Gasket
14	Panel
15	Spacer washer
16	Stud (37 rqr)
17	Stud (27 rqr)
18	Spacer (9 rqr)
19	Gasket
20	Sleeve (6 rqr)
21	Panel
22	Nut (4 rqr)
23	Washer (8 rqr)
24	Sight glass window
25	Stud (65 rqr)
26	Screw (4 rqr)
27	Gasket
28	Power supply panel
29	Panel
30	Gasket
31	Fiber glass insulation
32	Rubber insulation
33	Rubber insulation
34	Fiber glass insulation
35	Fiber glass insulation
36	Fiber glass insulation
37	Fiber glass insulation
38	Rubber insulation

Figure 4-4—Continued.

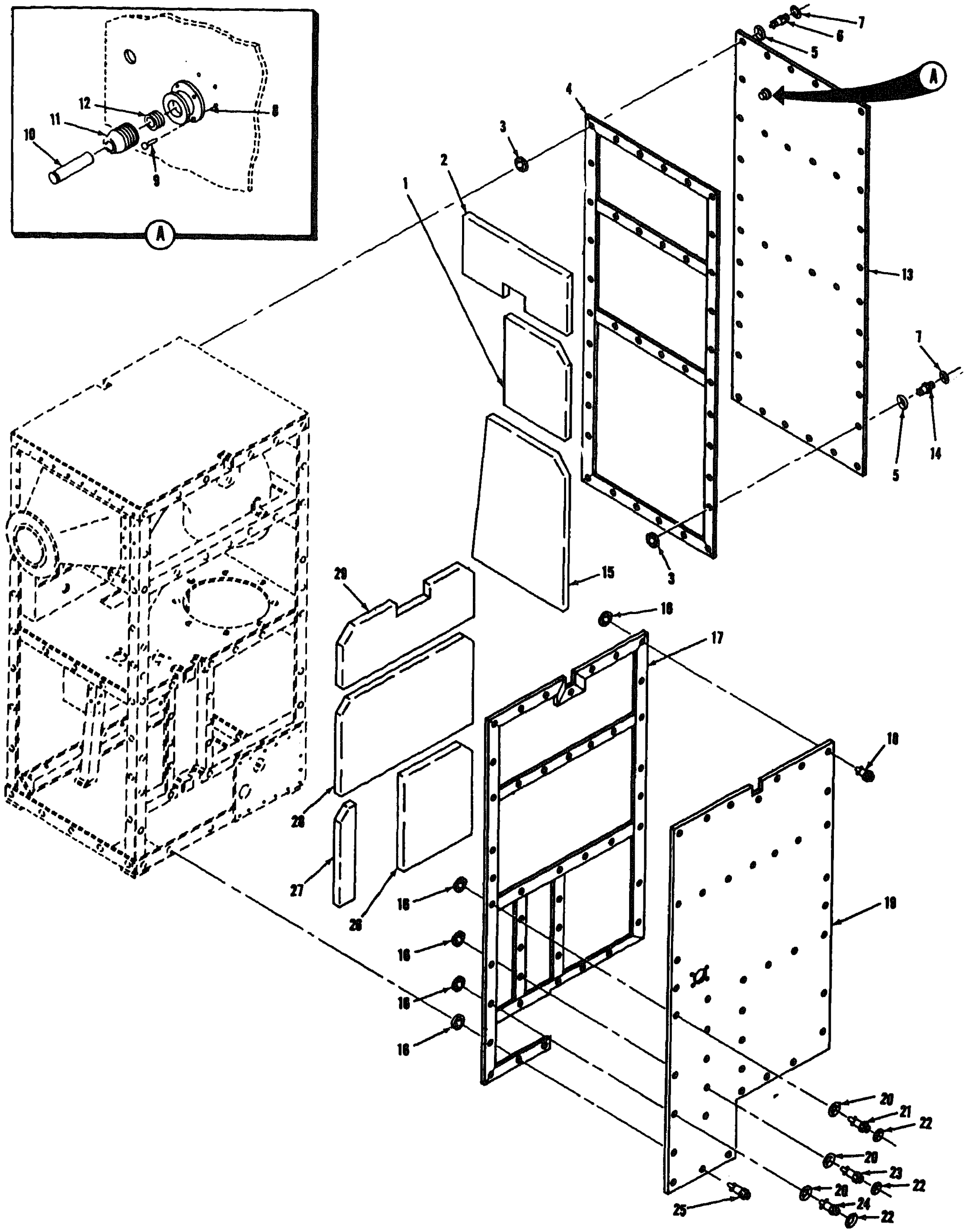


MEC 4120-210-15/4-4 ②

Evaporator section, front and left-side panels, Models VEA4–3–102103 and VEA4–3–102103MOD
Figure 4-4—Continued.

1	Preformed packing
2	Stud fastener
3	Preformed packing
4	Access cover
5	Washer
6	Gasket
7	Stud fastener
8	Left side panel
9	Gasket
10	Insulation
11	Insulation
12	Washer
13	Gasket
14	Front panel
15	Preformed packing
16	Stud fastener
17	Stud fastener
18	Stud fastener
19	Screw
20	Rivet
21	Instruction plate
22	Stud fastener
23	Sight glass window
24	Washer
25	Nut
26	Rivet
27	Anchor nut
28	Gasket
29	Evaporator outlet duct
30	Washer
31	Bolt
32	Rivet
33	Stud fastener receptacle
34	Stud fastener
35	Stud fastener

Figure 4-4—Continued.



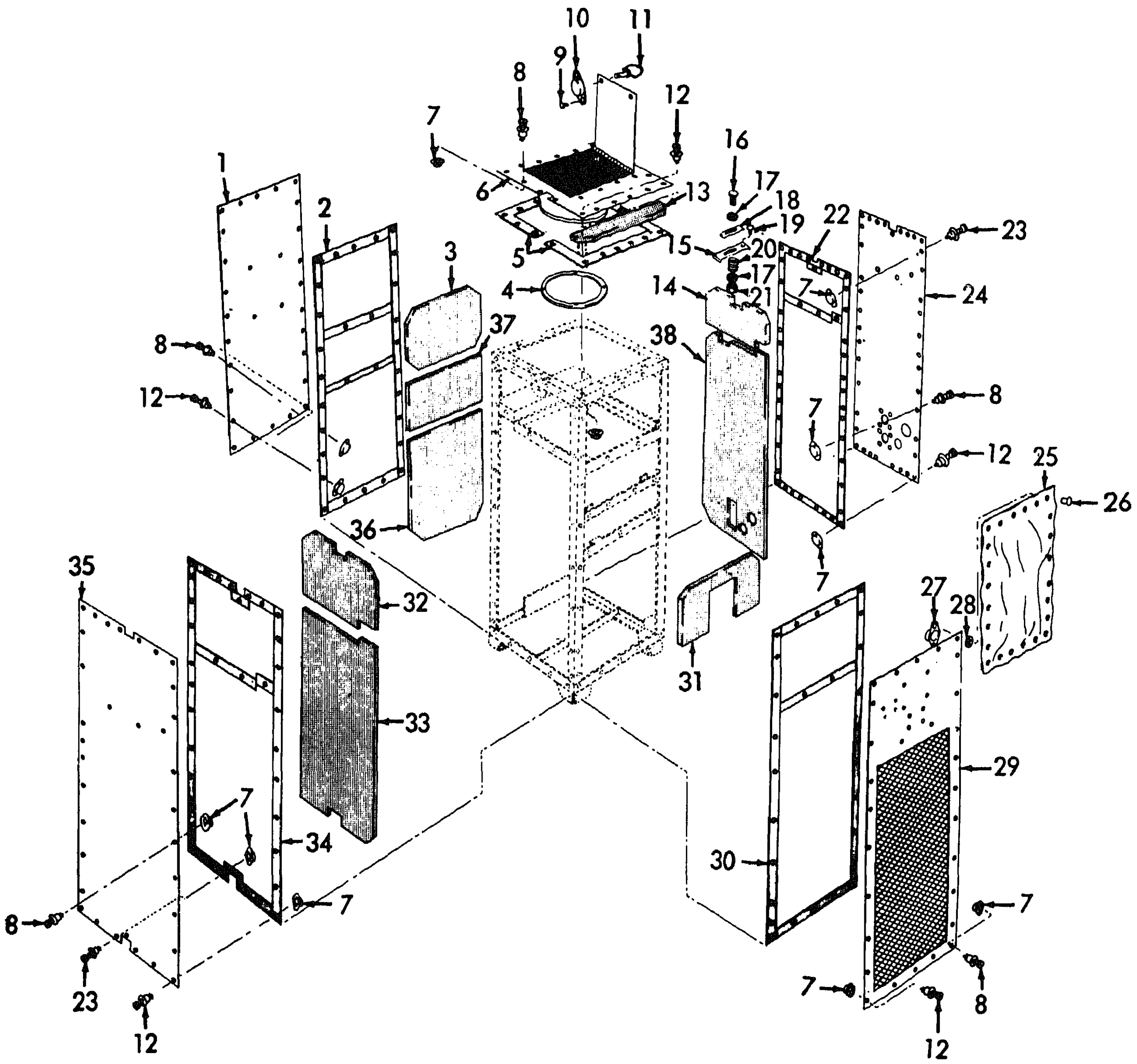
MEC 4120-210-15/4-4 ③

Evaporator section, rear and right-side panels, Models VEA4-8-102108 and VEA4-8-102108MOD

Figure 4-4—Continued.

1	Rubber insulation	11	Boot	21	Stud fasten
2	Rubber insulation	12	Grommet	22	Preformed packing
3	Stud retaining washer	13	Rear panel	23	Stud fastener
4	Panel gasket	14	Stud fastener	24	Stud fastener
5	Preformed packing	15	Rubber insulation	25	Stud fastener
6	Stud fastener	16	Stud retaining washer	26	Rubber insulation
7	Preformed packing	17	Panel gasket	27	Rubber insulation
8	Guide	18	Stud fastener	28	Rubber insulation
9	Rivet	19	Right side panel	29	Rubber insulation
10	Reset button	20	Preformed packing		

Figure 4-4—Continued.



MSC 4120-213-15/25 ①

1	Front panel	6	Top cover	11	Turnlock fastener stud(2rqr)
2	Rubber gasket	7	Push-on-nut (146 rqr)	12	Turnlock fastener stud (22 rqr)
3	Fiberglass insulation	8	Turnlock fastener stud (120 rqr)	13	Rubber insulation
4	Rubber gasket	9	Rivet (2 rqr)	14	Rubber insulation
5	Rubber gasket	10	Stud receptacle (2 rqr)	15	Door bracket

Condenser section
Figure 4-4—Continued.

16	Bolt	24	Side panel	32	Fiberglass insulation
17	Washer (2 rqr)	25	Canvas cover	33	Fiberglass insulation
18	Condenser door slide	26	Rivet (5 rqr)	34	Gasket
19	Rivet (4 rqr)	27	Cover fastener stud (20 rqr)	35	Side panel
20	Lock spring	28	Washer (20 rqr)	36	Fiberglass insulation
21	Nut	29	Rear panel	37	Fiberglass insulation
22	Gasket	20	Gasket	38	Rubber insulation
23	Turnlock fastener stud (3 rqr)	31	Rubber insulation		

Condenser section
Figure 4-4—Continued.

Section VI. REFRIGERANT SYSTEM

4-23. General

The refrigerant system, illustrated by the refrigerant flow chart in figure 4-2, is a mechanical, vapor cycle-type circuit, consisting basically of a thermoexpansion valve, evaporator, motor compressor assembly, condenser, and the necessary valves and safety cutout devices that automatically control operation. Cooling of the circulated air is accomplished by the evaporator. The thermoexpansion valve releases high-pressure liquid refrigerant into the evaporator at a reduced pressure. The temperature at which the liquid refrigerant will boil is lowered below ambient air temperatures. The liquid refrigerant begins to vaporize by absorbing heat from the air passing over the external surfaces of the evaporator coil. The vapor, containing the absorbed heat, is pumped out of the evaporator by the motor compressor assembly and forced into the condenser under high pressure, where it is cooled and condensed back in to a liquid. The heat released during condensation is carried off by the condensing air stream. The liquid refrigerant drains to the bottom of the condenser for reuse by the thermoexpansion valve. On Model VEA4-3-102103MOD, liquid line solenoid valve closes to stop refrigerant flow to expansion valve when discharge air thermostat is satisfied and cooling is not required. When liquid line solenoid valve closes, the hot gas bypass solenoid valve opens. This is controlled by a pulse relay and because compressor is still operating, high pressure, high temperature refrigerant flown into line. When temperature in line becomes excessive, the liquid quench valve opens and permits high pressure, liquid refrigerant to vaporize and flow into line, thereby reducing line temperature.

4-24. Inspecting Refrigerant System for Leaks

a. Halide Leak Test. The halide torch is used for detecting leaks in the refrigerant system. The torch consists of a small cylinder of acetylene gas with a cylinder shutoff valve assembly and is connected to the gas pressure regulator. The copper element, which is heated by the flame, is visible through the window in the flame shield. The flame normally burns with a green color during operation. An exploring tube is passed near a leak, the refrigerant gas is drawn into the tube and causes the flame to change to a blue color. Position the halide torch so that the flame window is visible. Pass the open end of the exploring tube close to all lines, fittings, and valves. Carefully note any change in the color of the flame. If a leak is detected, mark the location with the chalk and continue testing until the entire system has been checked.

Note. Start the halide test at one point and systematically trace out all exposed lines, fittings, and valves. This method assures that the entire system will be covered and tested for leaks.

b. Soapsuds Test. The leaks in the refrigerant system, located by the halide torch are accurately pinpointed by brushing the leaking area with soapsuds and noting the exact location of the leak by appearance of soap bubbles.

Note. Be sure to allow the soapsuds to stand long enough to form bubbles. Small leaks will take longer to form bubbles. Discharge refrigerant and repair as they are found.

4-25. Test Manifold and Pressure Gages

A test manifold with pressure gages and charging lines is required to purge and charge the refrigerant system. The common outlet of the manifold is connected to the charge valve with 1 of 3 charging lines. The two remaining lines connect the nitrogen and Freon service cylinders to the test manifold. Two valves are included as an intergral part of the manifold for controlling flow from either of the two service cylinders.

4-26. Servicing the Refrigerant System

a. General. When the air conditioner must undergo maintenance that requires opening the refrigerant system, the system must first be discharged and subsequently purged, evacuated and charged when the maintenance is completed. This paragraph covers the four basic procedures involved in servicing the refrigerant system.

b. Discharging.

(1) Remove the condenser section panels (para 3-23).

(2) Refer to figure 4-5 and discharge the refrigerant system.

c. Purging. Refer to figure 4-5 and purge the refrigerant system.

d. Evacuation.

(1) Discharge the refrigerant system (*b* above).

(2) Refer to figure 4-5 and evacuate the refrigerant system.

e. Charging.

(1) Discharge the refrigerant system (*b* above).

(2) Evacuate the refrigerant system (*d* above).

(3) Refer to figure 4-5 and charge the refrigerant system.

(4) Install the condenser section panels (para 3-23).

Note. If compressor motor "burn-out" should occur, the refrigerant system must be processed to remove the resulting acidity and contaminating foreign particles.

f. Decontamination Following Motor "Burn-Out".

(1) Discharge refrigerant system (*b* above).

(2) Remove defective compressor motor (para 4-29).

(3) Install new compressor motor (para 4-29).

(4) Replace filter drier (para 4-27).

Note. It is recommended that an external filter drier be installed in the line from the test manifold to the charge valve.

(5) Triple evacuate refrigerant system (*c* above); break final vacuum with dry nitrogen to 3 psig.

(6) See that oil is at the proper level, add or drain as necessary (para 4-29).

(7) Install an external filter drier in line from refrigerant cylinder to test manifold and charge refrigerant system (*d* above).

(8) Test the refrigerant system for leaks (para 4-24).

(9) Start the air conditioner (para 2-11) and allow it to operate for 48 hours.

(10) Check color of oil through oil flow sight glass. If oil is discolored, change the oil (para 4-29) and the filter drier (para 4-27).

(11) Make certain the system is completely dry, start the unit, and repeat (10) above, at 14-day intervals until oil stays clear for at least 30-days.

4-27. Filter Drier

a. General. The filter drier, located in the evaporator section, is a desiccant, throw-away type unit, used to remove moisture, sludge, and dirt from the refrigerant. The filter drier must be replaced each time the refrigerant system is opened for maintenance and service.

b. Removal.

(1) Discharge refrigerant system (para 4-26).

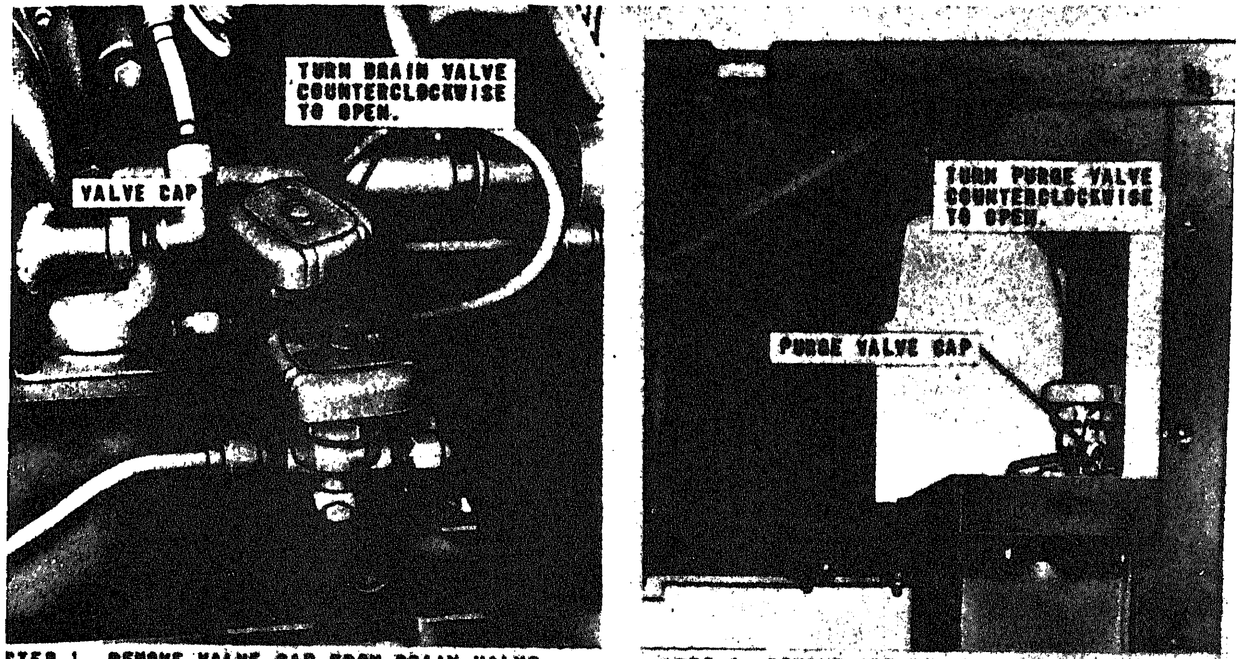
(2) Refer to figure 4-6 and remove the filter drier.

c. Installation.

(1) Refer to figure 4-6 and install the filter drier.

(2) Connect condenser and evaporator sections as required (para 4-22).

(3) Charge the refrigerant system (para 4-26), and test for leaks (para 4-24).


TURN DRAIN VALVE COUNTERCLOCKWISE TO OPEN.
VALVE CAP
TURN PURGE VALVE COUNTERCLOCKWISE TO OPEN.
PURGE VALVE CAP

STEP 1. REMOVE VALVE CAP FROM DRAIN VALVE AND CONNECT ONE END OF A FLEXIBLE CHARGING LINE TO DRAIN VALVE.

STEP 2. PLACE THE OTHER END OF THE LINE IN A SUITABLE CONTAINER TO RECEIVE ANY OIL THAT MAY BE DISCHARGED WITH THE REFRIGERANT.

STEP 3. OPEN DRAIN VALVE SLOWLY AND ALLOW REFRIGERANT TO DISCHARGE FROM THE SYSTEM.

WARNING: REFRIGERANT IS UNDER PRESSURE. BE VERY CAREFUL WHEN DISCHARGING THE SYSTEM TO PREVENT REFRIGERANT FROM CONTACTING EYES AND SKIN.

STEP 4. CLOSE THE DRAIN VALVE, REMOVE CHARGING LINE, AND INSTALL VALVE CAP.

A. DISCHARGING

STEP 1. REMOVE THE PURGE VALVE CAP.

STEP 2. OPEN PURGE VALVE SLIGHTLY FOR A FEW SECONDS. CLOSE VALVE.

STEP 3. REPEAT STEP 2 AS NECESSARY UNTIL DISCHARGE PRESSURE REMAINS WITHIN NORMAL RANGE (NORMAL OPERATING PRESSURE IS APPROXIMATELY 110 PSIG). REPLACE PURGE VALVE CAP.

B. PURGING

MSC 4120-213-15/28 ①

Discharging and purging

Figure 4-5. Refrigerant system, discharging, purging, evacuation, and charging instructions.

4-28. Oil Filter, Sight Glass, and Oil Tubes and Fittings

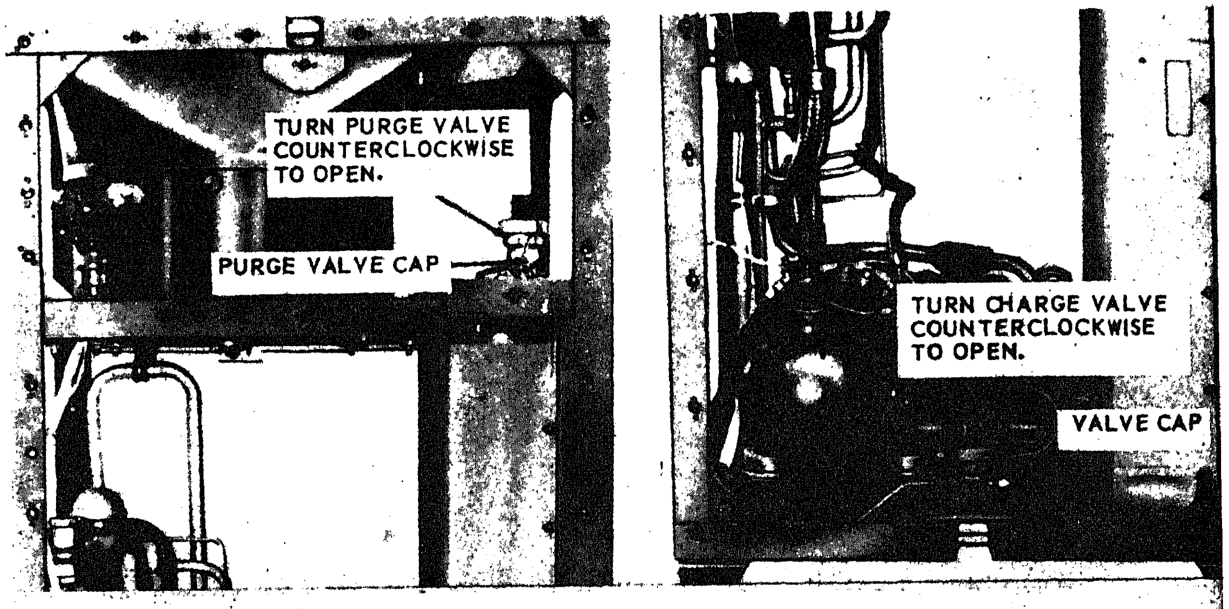
a. Removal.

(1) Discharge the refrigerant system (para 4-26).

(2) Refer to figure 4-7 and remove the oil filter, sight glass, and oil tubes and fittings.

b. Installation.

(1) Refer to figure 4-7 and install oil filter, sight glass, and oil tubes and fittings.


TURN PURGE VALVE COUNTERCLOCKWISE TO OPEN.
PURGE VALVE CAP
TURN CHARGE VALVE COUNTERCLOCKWISE TO OPEN.
VALVE CAP

NOTE: EVACUATION OF THE REFRIGERANT SYSTEM NEED ONLY BE DONE IF SYSTEM IS SUSPECTED OF BEING CONTAMINATED. NOTIFY DEPOT MAINTENANCE WHEN NECESSARY TO EVACUATE A CONTAMINATED REFRIGERANT SYSTEM.

STEP 1. REMOVE CHARGE VALVE CAP. CONNECT ONE END OF A LINE TO THE CHARGE VALVE AND THE OTHER END, THROUGH A PRESSURE REGULATOR, TO A CYLINDER OF DRY NITROGEN.

STEP 2. REMOVE PURGE VALVE CAP AND OPEN THE PURGE VALVE.

STEP 3. OPEN CHARGE VALVE. OPEN SHUTOFF VALVE ON NITROGEN CYLINDER AND ALLOW DRY NITROGEN TO FLOW THROUGH SYSTEM UNTIL ALL AIR AND MOISTURE HAS BEEN FORCED OUT THE PURGE VALVE. CLOSE THE NITROGEN CYLINDER VALVE. CLOSE PURGE VALVE AND INSTALL CAP.

STEP 4. DISCONNECT LINE FROM NITROGEN CYLINDER AND CONNECT IT TO A VACUUM PUMP. FOLLOW INSTRUCTIONS WITH THE PUMP AND DRAW A 28-INCH VACUUM. HOLD CONDITION FOR 8 HOURS OR AS NECESSARY.

STEP 5. CLOSE CHARGE VALVE AND DISCONNECT PUMP. CHARGE THE SYSTEM (4-25e). TEST FOR LEAKS (4-24).

MEC 4120-210-15/4-5 ②

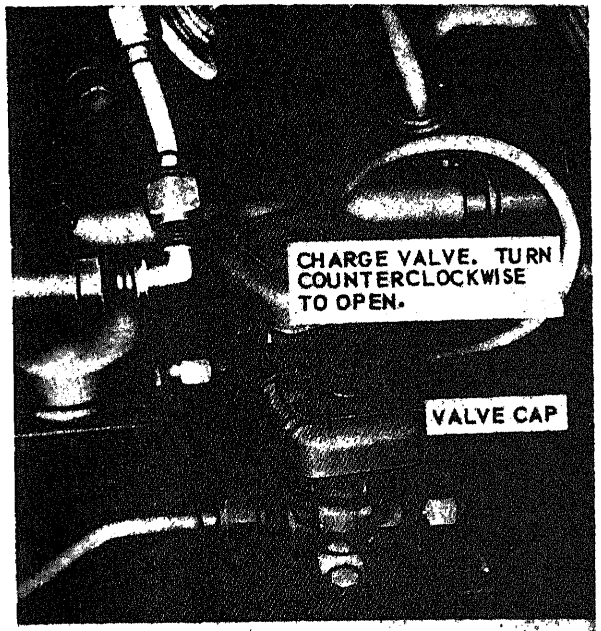
Evacuation.

Figure 4-5—Continued.

(2) Charge refrigerant system (para 4-26).

4-29. Motor Compressor

a. General. The motor compressor is comprised of a helirotor, positive displacement-type compressor driven by an integral 8-horsepower, 208-or 416-volt, 400-cycle, 3-phase motor having an operating speed of 7,600 rpm (Models VEA4-3, VEA4-3-102103, and VEA-4-3-102103MOD) or 208-volt motors of 13-horsepower and 11,500 rpm. The refrigerant gas enters the motor end of the motor compressor and passes around the motor stator windings and into the meshing rotors of the compressor. The compressing action of the revolving rotors forces the refrigerant gas out of the motor compressor, through the oil separator, and into the condenser where it is changed from a gaseous state to a liquid.



STEP 1. REMOVE CHARGE VALVE CAP AND CONNECT ONE END OF A CHARGING LINE LOOSELY TO THE CHARGE VALVE. CONNECT THE OTHER END TO REFRIGERANT CYLINDER.

STEP 2. OPEN REFRIGERANT CYLINDER VALVE SLIGHTLY TO RELEASE ANY AIR FROM THE CHARGING LINE. CLOSE REFRIGERANT CYLINDER VALVE AND TIGHTEN THE CONNECTION AT THE CHARGE VALVE.

STEP 3. INVERT AND ELEVATE THE REFRIGERANT CYLINDER, OPEN CYLINDER VALVE AND CHARGE VALVE, AND ADMIT 12 POUNDS OF REFRIGERANT INTO SYSTEM.

CAUTION: USE EXTREME CARE WHEN ADMITTING REFRIGERANT SINCE IT IS POSSIBLE FOR LARGE QUANTITIES TO ENTER THE SYSTEM IN A VERY SHORT TIME. WEIGH CYLINDER BEFORE CHARGING AND WEIGH IT CONSTANTLY DURING THE PROCESS TO BE CERTAIN WHEN 12 POUNDS HAS BEEN ADMITTED.

STEP 4. CLOSE ALL VALVES AND CAREFULLY LOOSEN CHARGING LINE AT CHARGE VALVE TO RELEASE ANY TRAPPED PRESSURE. REMOVE ALL LINES AND REPLACE ALL VALVE CAPS. TEST FOR LEAKS (PAR. 4-24).

D. CHARGING

MEC 4120-210-15/4-5 ③

Charging

Figure 4-5—Continued.

b. On-Equipment Testing.

(1) Remove the condenser section front panel (para 3-23).

(2) Tag and disconnect the motor leads of the condenser section wiring harness.

(3) Connect a multimeter between motor terminals T0 and T1, T0 and T2, and T0 and T3. If the multimeter fails to indicate continuity on any of these tests, an open circuit is indicated and the stator must be replaced.

(4) Use a megohmmeter and test between the motor housing and the terminal T0. A reading of less than 0.4 megohm indicates faulty insulation and the stator must be replaced.

(5) Use a multimeter and test between motor termianls OL1 and OL2. If the multimeter indicates continuity when the motor is cold, the temperature limit switch circuit is defective and the stator must be replaced.

(6) Use a megohmeter and test between terminal T0 and terminal OL1 and OL2 in turn. A reading of less than 0.4 megohm on either test indicates faulty insulation and the stator must be replaced.

Note. The terminal designations referred to in (1) through (6) above are stamped in the stator housing adjacent to their respective terminals.

c. Removal.

(1) Remove the oil tube assemblies (para 4-28).

***Caution:* Seal all open tubes and fittings to prevent contamination by dirt and moisture-laden air.**

(2) Refer to figure 4-8 and remove the motor compressor and shock mounts.

d. Disassembly.

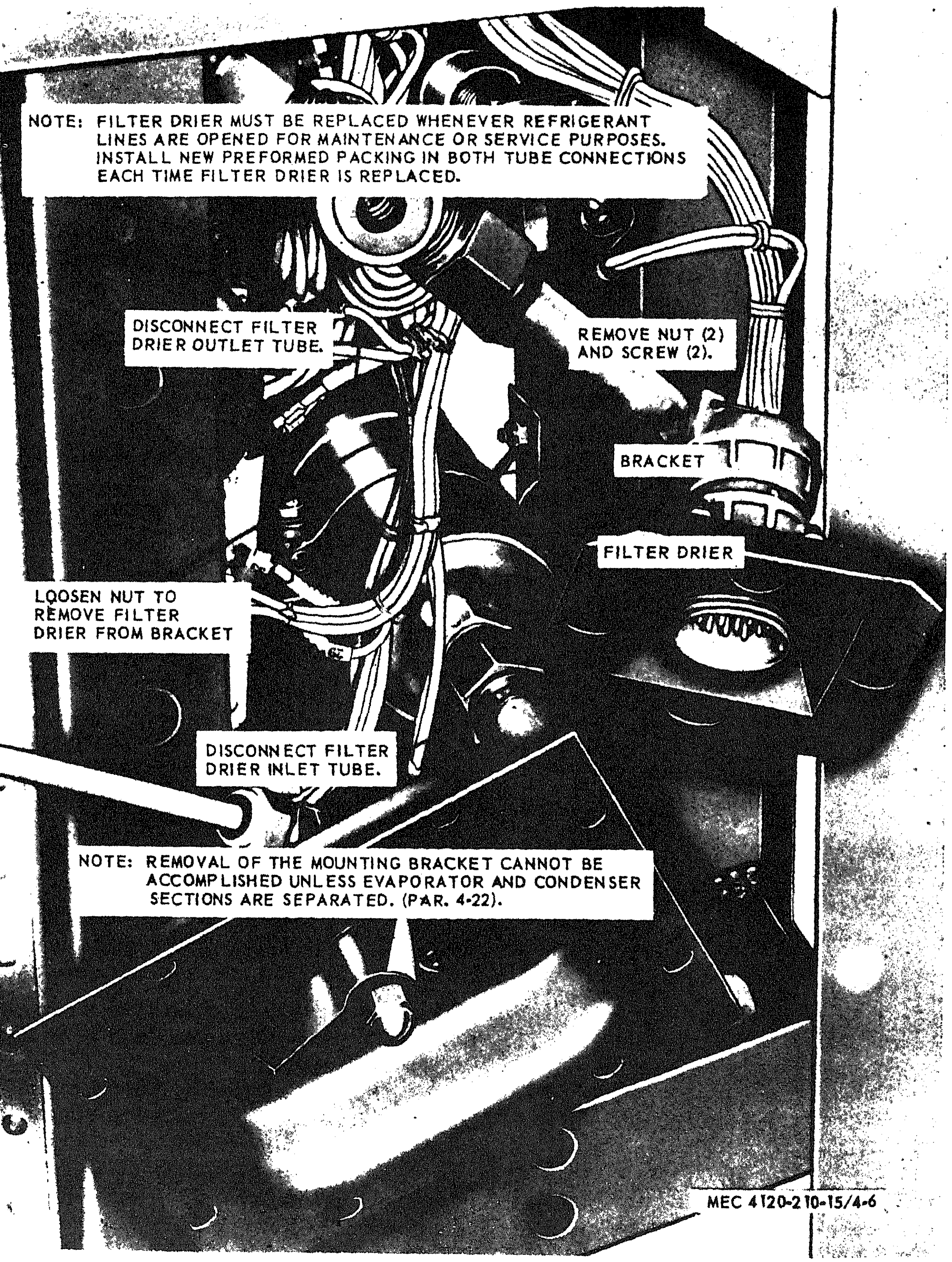
(1) Invert compressor to drain oil.

(2) Refer to figure 4-9 and disassemble the motor compressor.

Note. Only motor will be repaired. Report to MEC for final disposition, reference unserviceable compressor.

e. Testing. Refer to TM 5-764.

f. Reassembly. Refer to figure 4-9 and reassemble motor compressor.



NOTE: FILTER DRIER MUST BE REPLACED WHENEVER REFRIGERANT LINES ARE OPENED FOR MAINTENANCE OR SERVICE PURPOSES. INSTALL NEW PREFORMED PACKING IN BOTH TUBE CONNECTIONS EACH TIME FILTER DRIER IS REPLACED.

DISCONNECT FILTER DRIER OUTLET TUBE.

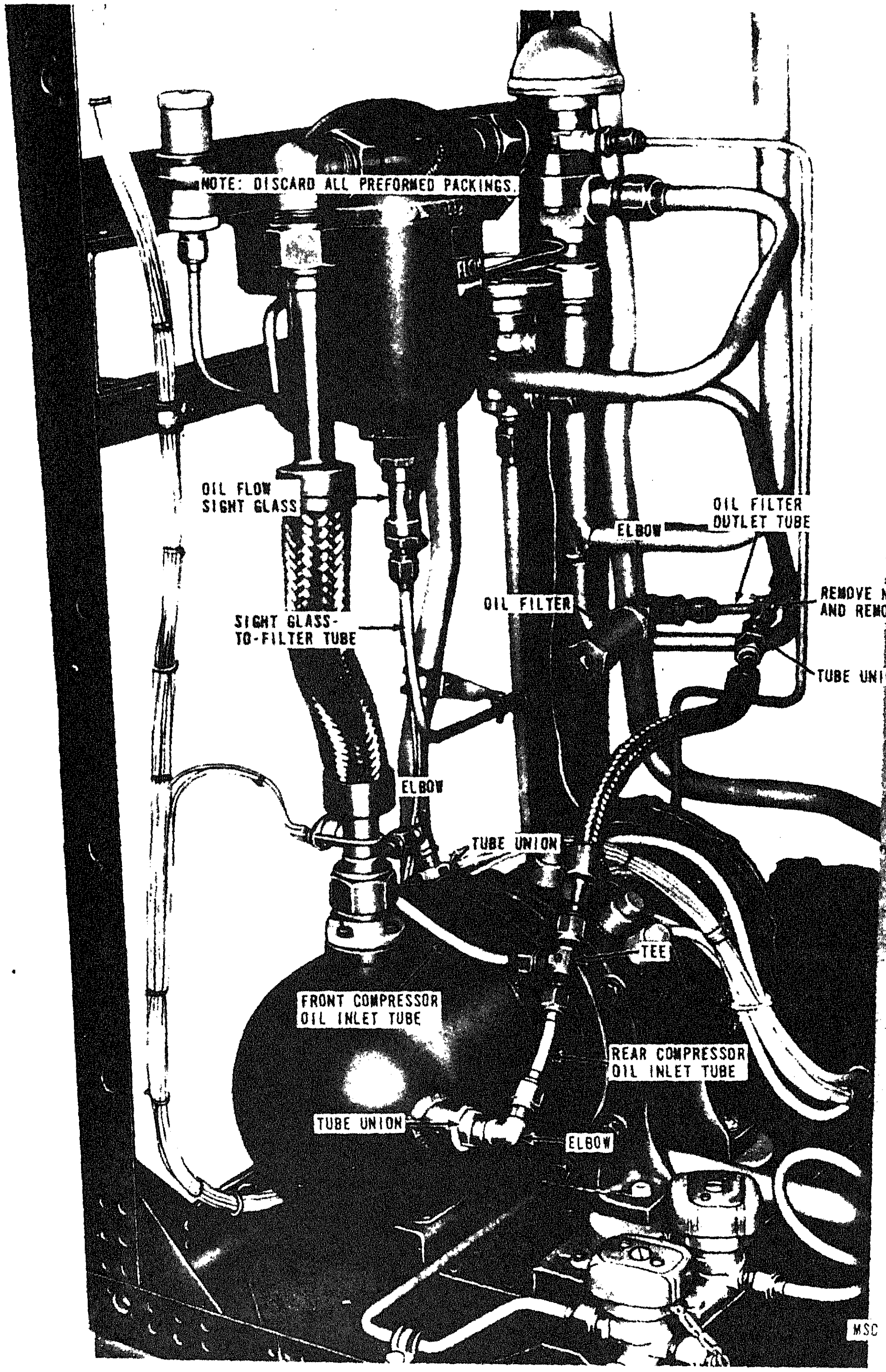
REMOVE NUT (2) AND SCREW (2).

LOOSEN NUT TO REMOVE FILTER DRIER FROM BRACKET

DISCONNECT FILTER DRIER INLET TUBE.

NOTE: REMOVAL OF THE MOUNTING BRACKET CANNOT BE ACCOMPLISHED UNLESS EVAPORATOR AND CONDENSER SECTIONS ARE SEPARATED. (PAR. 4-22).

Figure 4-6. Filter drier, removal and installation.



NOTE: DISCARD ALL PREFORMED PACKINGS.

REMOVE NUT (3), SCREW (3), AND REMOVE CLAMP (2).

Figure 4-7. Oil filter, sight glass, and oil tubes and fittings, removal and installation.

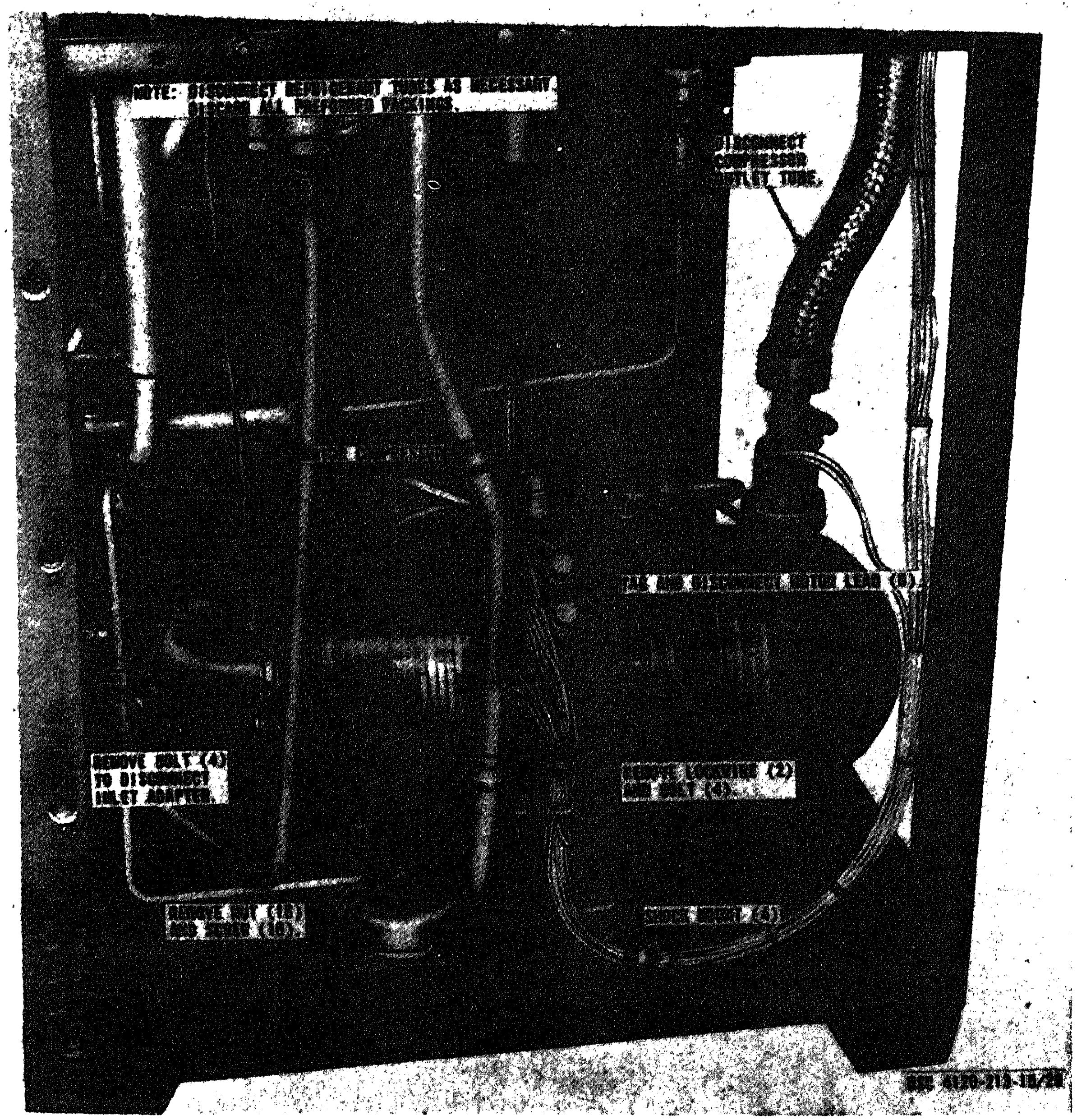

NOTE: DISCONNECT REFRIGERANT TUBES AS NECESSARY. DISCARD ALL PREFORMED PACKINGS.
DISCONNECT COMPRESSOR OUTLET TUBE.
TAG AND DISCONNECT MOTOR LEAD (8).
REMOVE BOLT (4) TO DISCONNECT INLET ADAPTER.
REMOVE LOCKWIRE (2) AND BOLT (4).
REMOVE NUT (16) AND SCREW (16).
SHOCK MOUNT (4)

Figure 4-8. Motor compressor and shock mounts, removal and installation.

g. Installation.

(1) Refer to figure 4-8 and install motor compressor and shock mounts.

(2) Install the oil tube assemblies (para 4-28).

(3) Evacuate refrigerant system (para 4-26).

(4) Refer to figure 4-10 and add oil to refrigerant system.

(5) Charge system (para 4-26) and test for leaks (para 4-24).

4-30. Refrigerant Tubes

a. General. The aluminum tubes which interconnect the various parts to the refrigerant system utilize threaded, flare-type tube fittings, sealed against leaks with preformed packings. New packings must be installed each time a fitting is opened for maintenance or service purposes. Refer to figure 4-2 for a diagram and flow chart of the refrigerant system.

b. Removal.

(1) Discharge refrigerant system (para 4-26).

(2) Refer to figure 4-11 and remove the refrigerant tubes.

c. Installation.

(1) Refer to figure 4-11 and install refrigerant tubes.

(2) Charge the refrigerant system (para 4-26), and test for leaks (para 4-24).

4-31. Service Valves

a. Removal.

(1) Discharge refrigerant system (para 4-26).

(2) Refer to figure 4-12 and remove the service valves.

b. Installation.

(1) Refer to figure 4-12 and install the service valves.

(2) Charge refrigerant system (para 4--26), and test for leaks (para 4-24).

4-32. Oil Separator and Liquid Quench Valve

a. Removal.

(1) Discharge refrigerant system (para 4-26).

(2) Refer to figure 4-13 and remove the oil separator and liquid quench valve.

b. Installation.

(1) Refer to figure 4-13 and install oil separator and liquid quench valve.

(2) Charge refrigerant system (para 4-26).

4-33. Hot Gas Bypass Valve (Models VEA4-3, VEA4-3-102103, VEA4-3-28029, and VEA4-3-28029MOD)

a. Removal.

(1) Discharge refrigerant system (para 4 26).

(2) Refer to figure 4-14 and remove hot gas bypass valve.

b. Installation.

(1) Refer to figure 4-14 and install hot gas bypass valve.

(2) Charge refrigerant system (para 4-26) and test for leaks (para 4-24).

4-34. Hot Gas Bypass Solenoid Valve (Model VEA4-3-102103MOD)

a. Removal.

(1) Discharge the refrigerant system (para 4-26).

(2) Refer to figure 4-15 and remove hot gas bypass solenoid valve.

b. Testing.

(1) Use a multimeter and test between two pins of the receptacle. If the reading is 5 percent above or below 25 ohms, replace solenoid valve.

(2) Test for continuity between valve body and one of the pins. If continuity is indicated, replace solenoid valve.

c. Installation.

(1) Refer to figure 4-15 and install hot gas bypass solenoid valve.

(2) Charge refrigerant system (para 4-26) and test for leaks (para 4-24).

4-35. Pressure Relief Valve

a. Removal.

(1) Discharge refrigerant system (para 4-26).

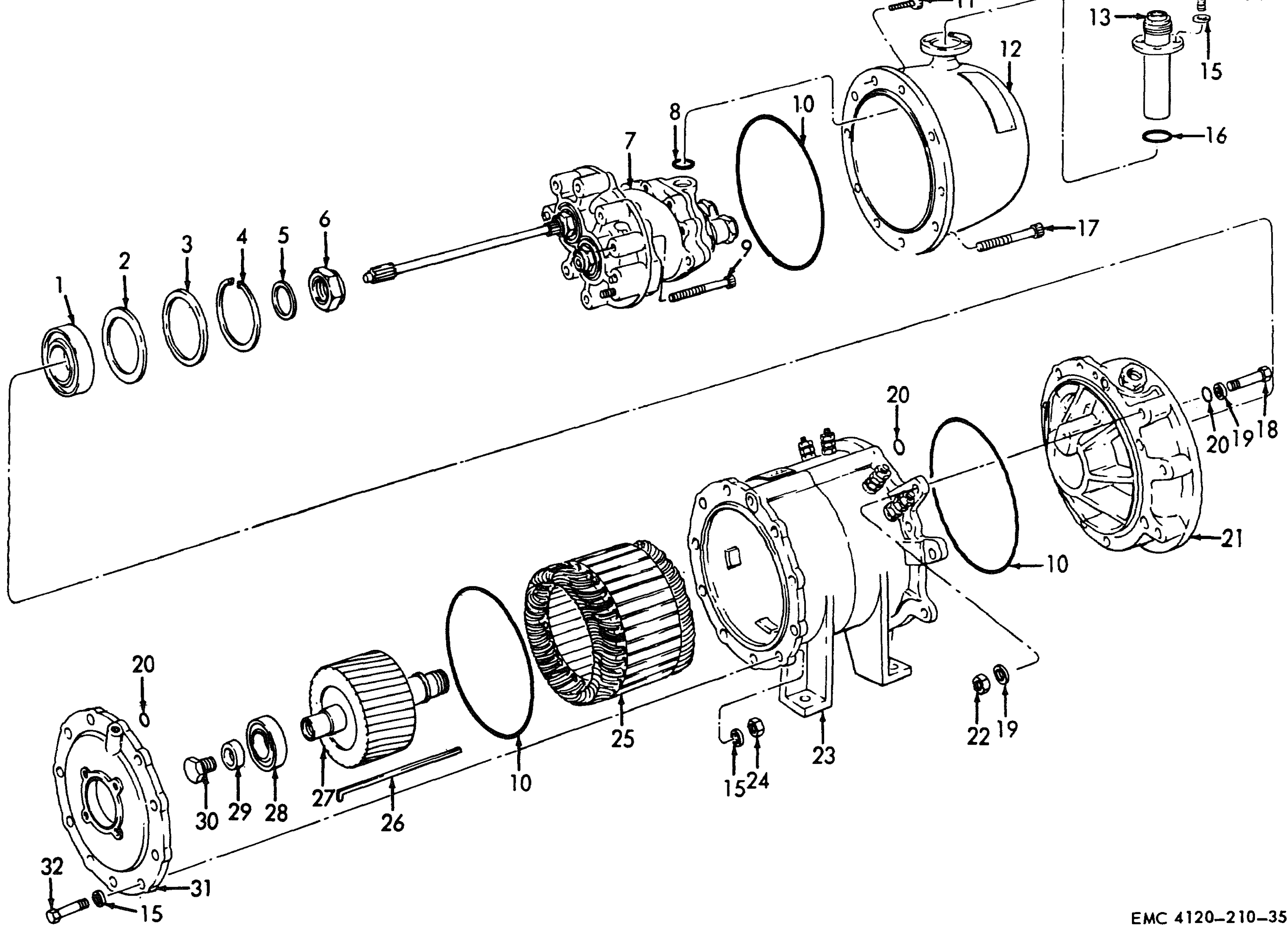
(2) Refer to figure 4-16 and remove the pressure relief valve.

b. Testing. Use compressed air and test pressure relief valve for zero leakage at 265 psi. If leak is present, valve is defective and must be replaced.

c. Installation.

(1) Refer to figure 4-16 and install pressure relief valve.

(2) Charge refrigerant system (para 4-26) and test for leaks (para 4-24).

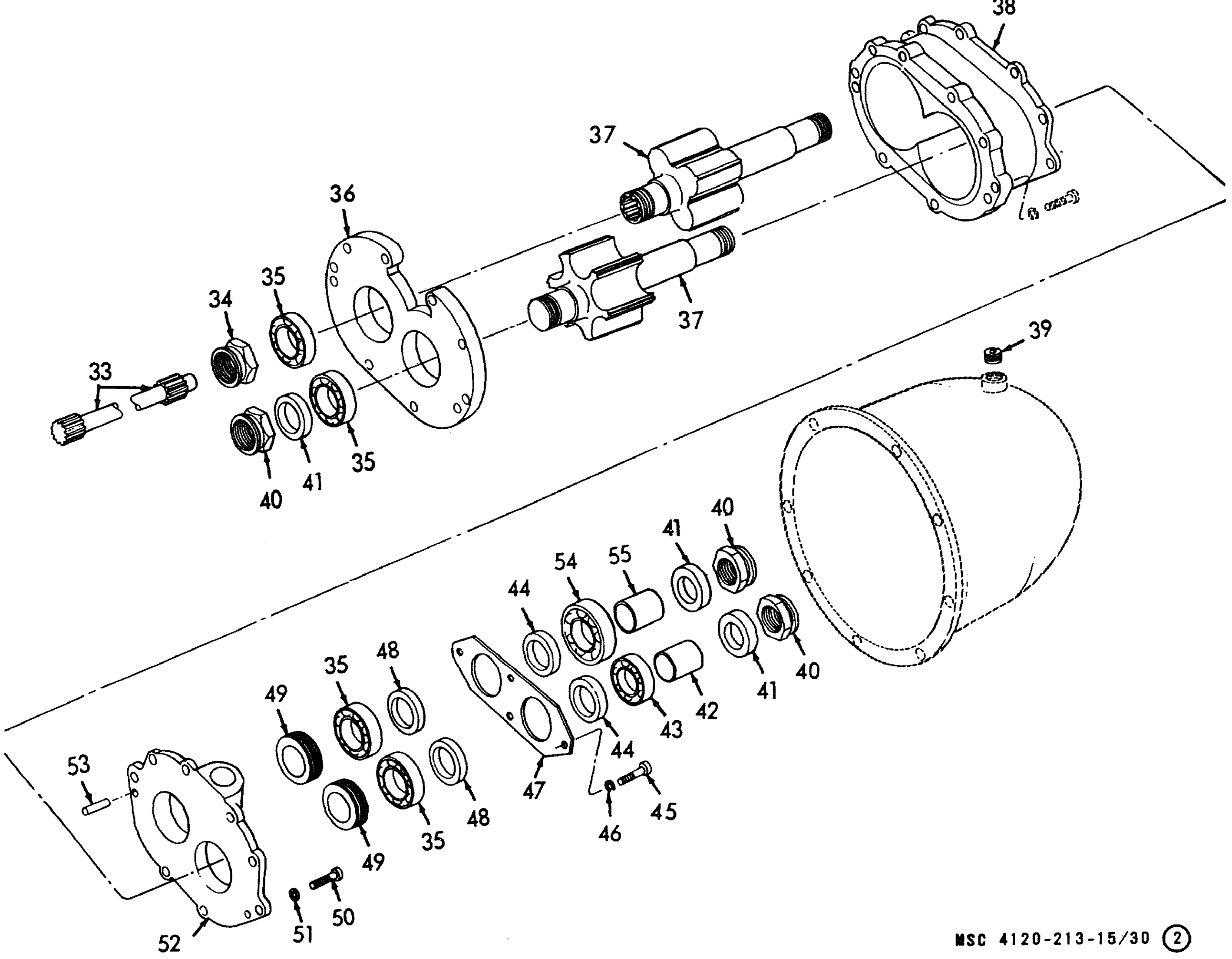


EMC 4120-210-35/9

Motor
Figure 4-9. Motor compressor, disassembly and reassembly.

1	Annular ball bearing	12	Shroud	23	Stator housing
2	Washer	13	Compressor discharge adapter	24	Nut
3	Washer	14	Screw	25	Stator
4	Retaining ring	15	Washer	26	Stator key
5	Washer	16	Packing	27	Rotor
6	Nut	17	Screw	28	Annular ball bearing
7	Compressor assemb.	18	Bolt	29	Spacer
8	Packing	19	Washer	30	Screw
9	Screw	20	Packing	31	End plate retainer
10	Packing	21	Compressor-to-motor- retainer	32	Bolt
11	Screw	22	Nut		

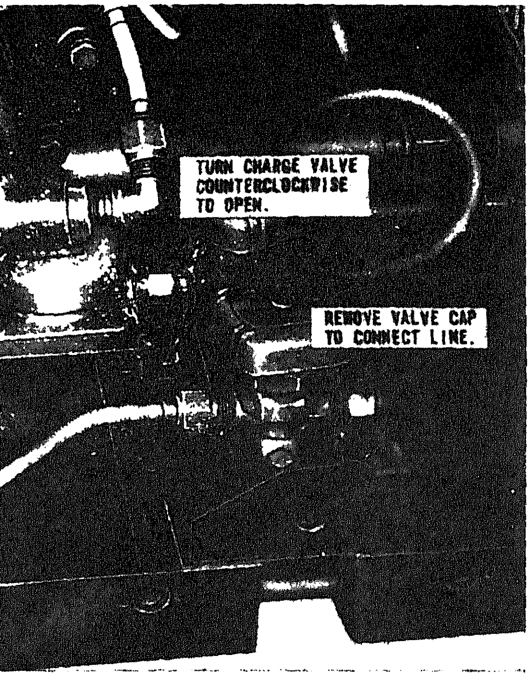
Figure 4-9—Continued.



Compressor
Figure 4-9—Continued.

33	Shaft
34	Nut
35	Ball bearing (4 rqr)
36	Compressor housing assembly
37	Rotor
38	Rotor housing
39	Fluid flow restrictor
40	Self locking nut (3 rqr)
41	Washer (3 rqr)
42	Spacer
43	Ball bearing
44	Thrust washer
45	Thrust plate screw (4 rqr)
46	Thrust plate lockwasher (4 rqr)
47	Thrust plate
48	Spring washer (2 rqr)
49	Seal (2 rqr)
50	Screw (8 rqr)
51	Washer (8 rqr)
52	Rotor end plate
53	Spring pin
54	Ball bearing
55	Spacer

Figure 4-9—Continued.


TURN CHARGE VALVE COUNTERCLOCKWISE TO OPEN.
REMOVE VALVE CAP TO CONNECT LINE.

STEP 1. POUR 550 TO 600 cc (CUBIC CENTIMETERS) OF REFRIGERANT COMPRESSOR OIL INTO A GRADUATED CONTAINER.
STEP 2. CONNECT A CHARGING LINE TO CHARGE VALVE AND PLACE THE OTHER END IN THE CONTAINER OF OIL.
NOTE: ALWAYS KEEP END OF LINE WELL BELOW THE SURFACE SO AIR WILL NOT ENTER THE SYSTEM.
STEP 3. OPEN CHARGE VALVE AND ALLOW 500 cc TO BE DRAWN INTO THE SYSTEM.

MSC 4120-213-15/31

Figure 4–10. Adding compressor oil.

4–36. Condenser and Subcooler

a. Removal.

(1) Discharge refrigerant system (para 4–26).

(2) Refer to figure 4–17 and remove the condenser and subcooler.

b. Cleaning, Inspection, and Repair.

(1) Clean the internal surface of the subcooler and tube elbow with a lint-free cloth saturated with compressor oil. Attach a wire to the cloth and pull it through the subcooler. Clean the cooling fins of the subcooler and condenser with compressed air.

(2) Inspect for damage and defects and replace defective or unserviceable gaskets, hardware, subcooler, or condenser.

c. Installation.

(1) Refer to figure 4–17 and install the condenser and subcooler.

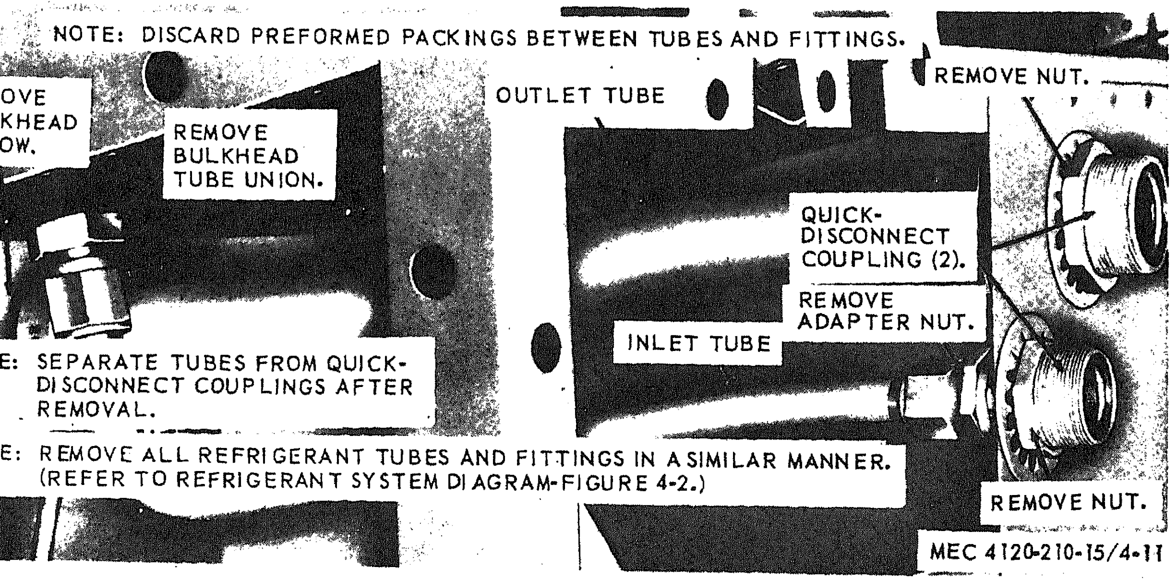
(2) Charge refrigerant system (para 4–26).

4–37. Liquid Refrigerant Line Solenoid Valve

a. Testing.

(1) Remove evaporator section front panel (para 3–23).

NOTE: DISCARD PREFORMED PACKINGS BETWEEN TUBES AND FITTINGS.

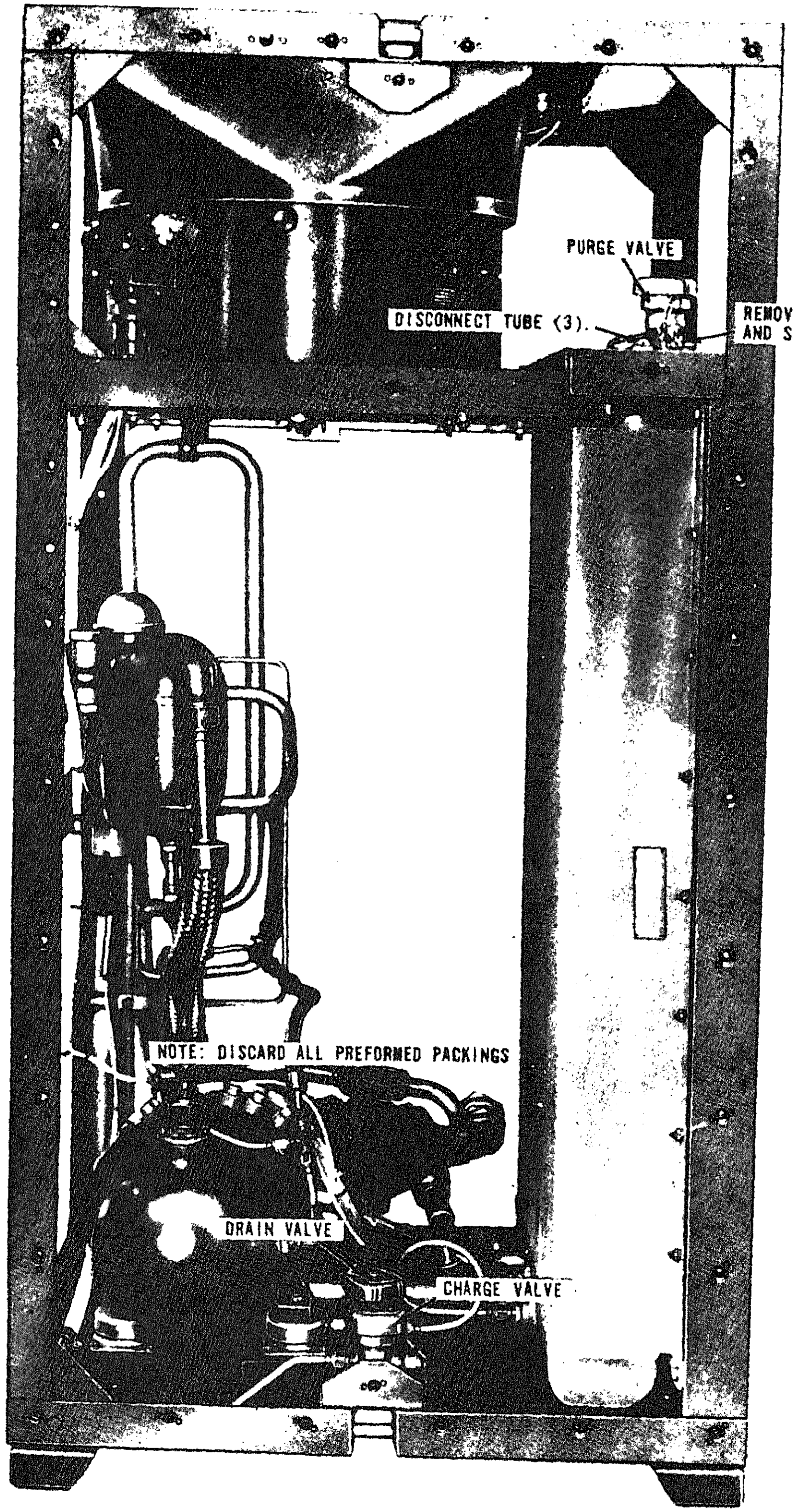


E: SEPARATE TUBES FROM QUICK-DISCONNECT COUPLINGS AFTER REMOVAL.

E: REMOVE ALL REFRIGERANT TUBES AND FITTINGS IN A SIMILAR MANNER. (REFER TO REFRIGERANT SYSTEM DIAGRAM-FIGURE 4-2.)

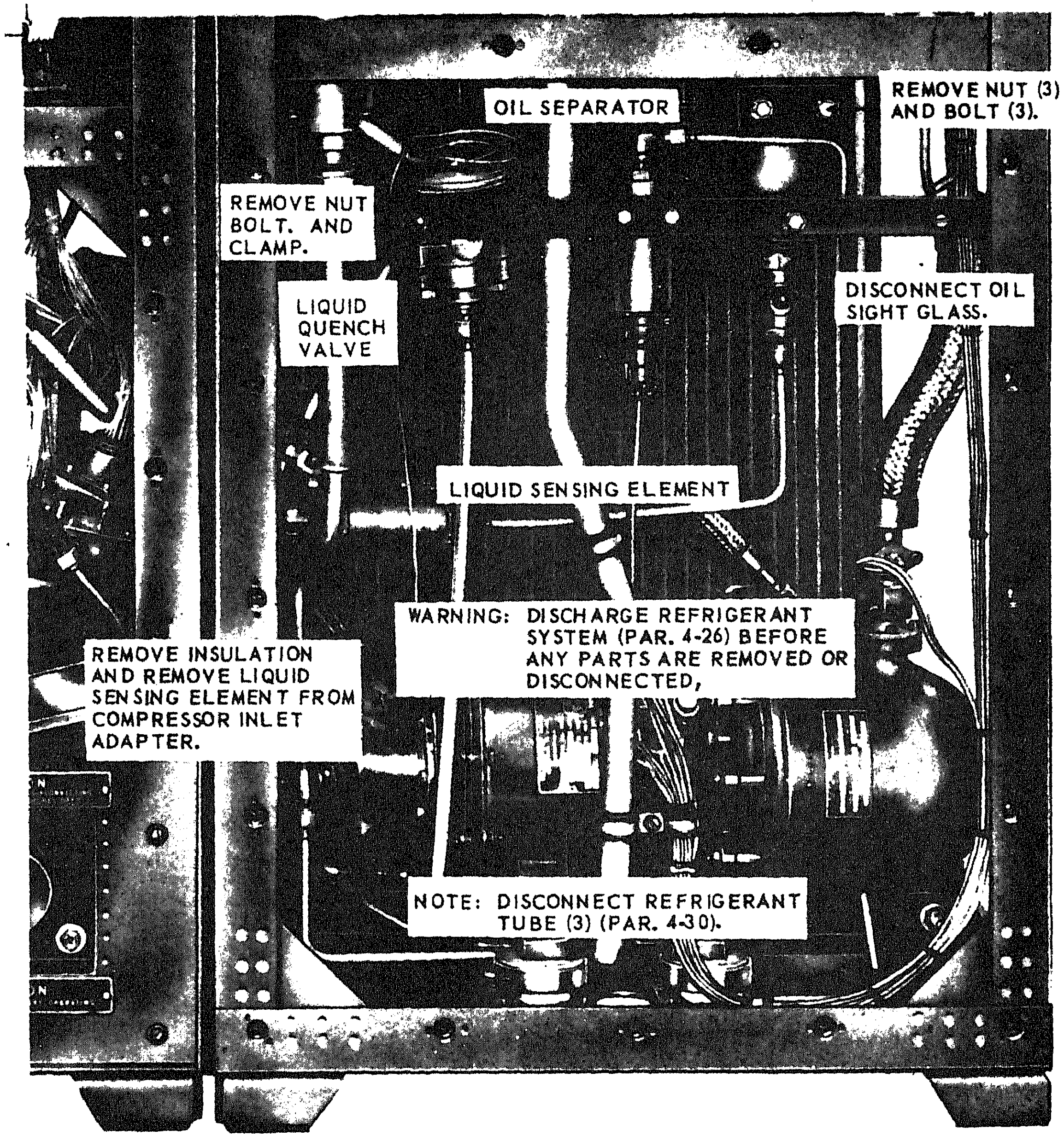
MEC 4120-210-15/4-11

Figure 4–11. Refrigerant tubes, removal and installation.


PURGE VALVE
DISCONNECT TUBE (3).
REMOVE NUT (6) AND SCREW (6).
NOTE: DISCARD ALL PREFORMED PACKINGS
DRAIN VALVE
CHARGE VALVE

MSC 4120-213-15/33

Figure 4–12. Service valves, removal and installation.


OIL SEPARATOR
REMOVE NUT (3) AND BOLT (3).
REMOVE NUT BOLT. AND CLAMP.
LIQUID QUENCH VALVE
DISCONNECT OIL SIGHT GLASS.
LIQUID SENSING ELEMENT
WARNING: DISCHARGE REFRIGERANT SYSTEM (PAR. 4-26) BEFORE ANY PARTS ARE REMOVED OR DISCONNECTED,
REMOVE INSULATION AND REMOVE LIQUID SENSING ELEMENT FROM COMPRESSOR INLET ADAPTER.
NOTE: DISCONNECT REFRIGERANT TUBE (3) (PAR. 4-30).

MEC 4120-210-15/4-13

Figure 4-13. Oil separator and liquid quench valve, removal and installation.

(2) Disconnect remote control receptacle harness from solenoid valve receptacle.

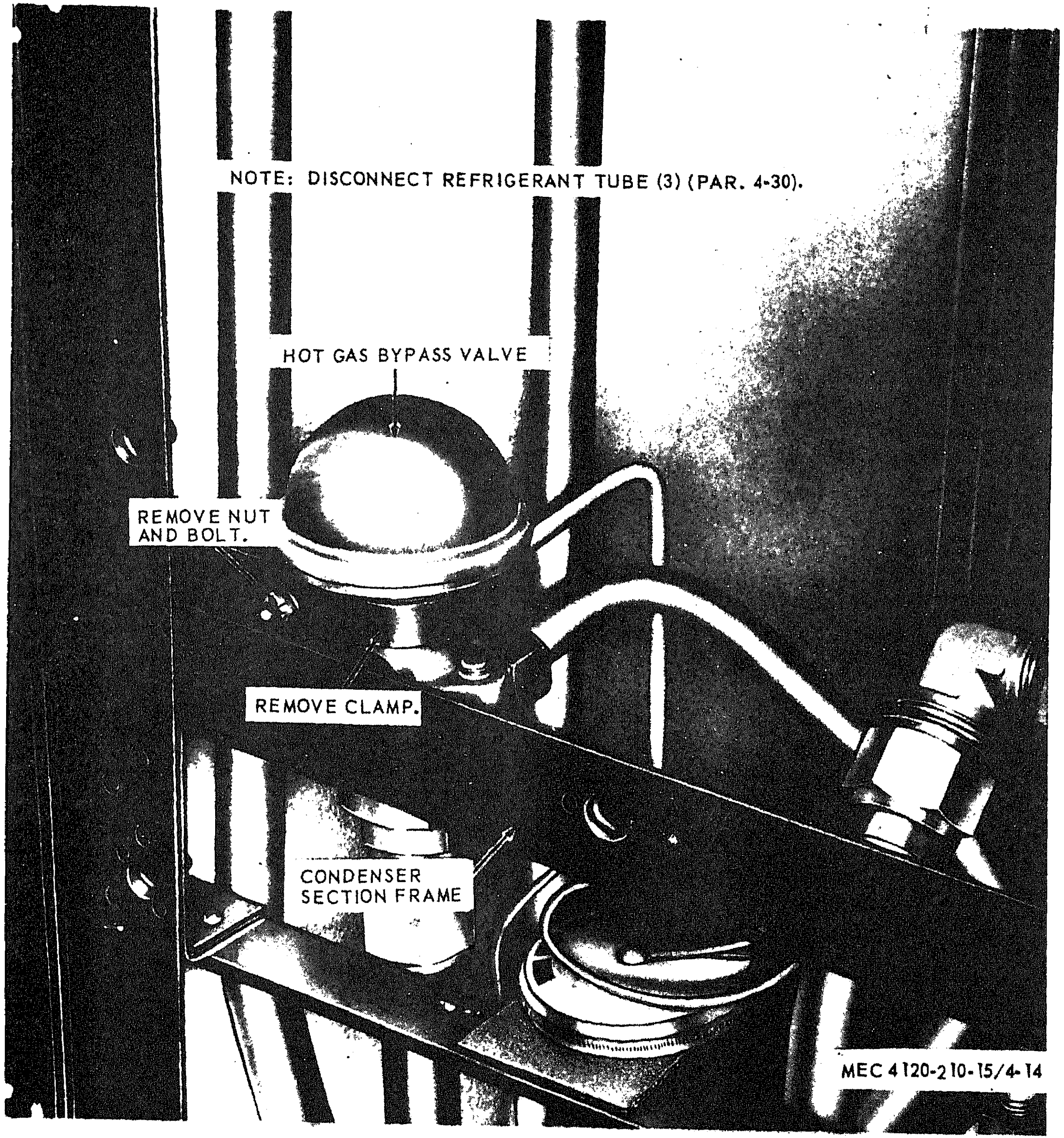
(3) Refer to paragraph 4-34 and test the solenoid valve.

b. Removal. Refer to figure 4-18 and remove the liquid refrigerant line solenoid valve.

c. Installation.

(1) Refer to figure 4-18 and install the liquid refrigerant line solenoid valve.

(2) Install the evaporator section front panel (para 3-23).



MEC 4120-210-15/4-14

Figure 4-14. Hot gas bypass valve, removal and installation.

4-38. Thermoexpansion Valve

a. Removal.

(1) Remove evaporator section inspection cover (para 3-23).

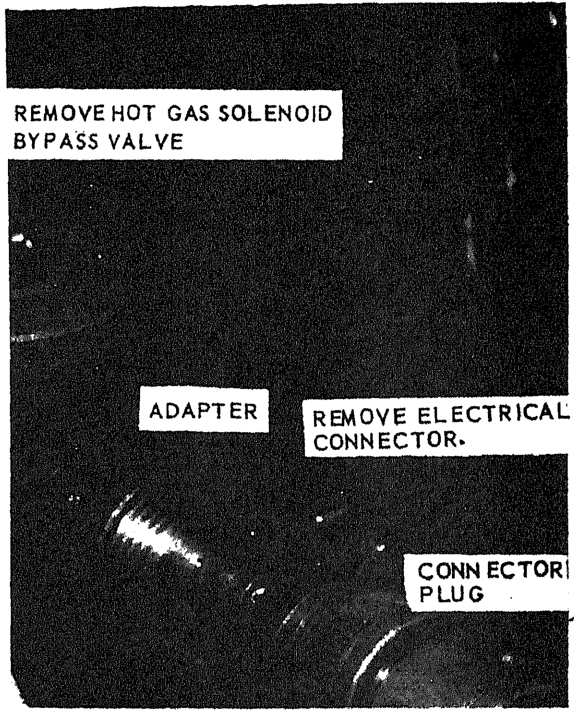
(2) Remove the filter drier (para 4-27).

(3) Refer to figure 4-19 and remove the thermoexpansion valve.

b. Installation.

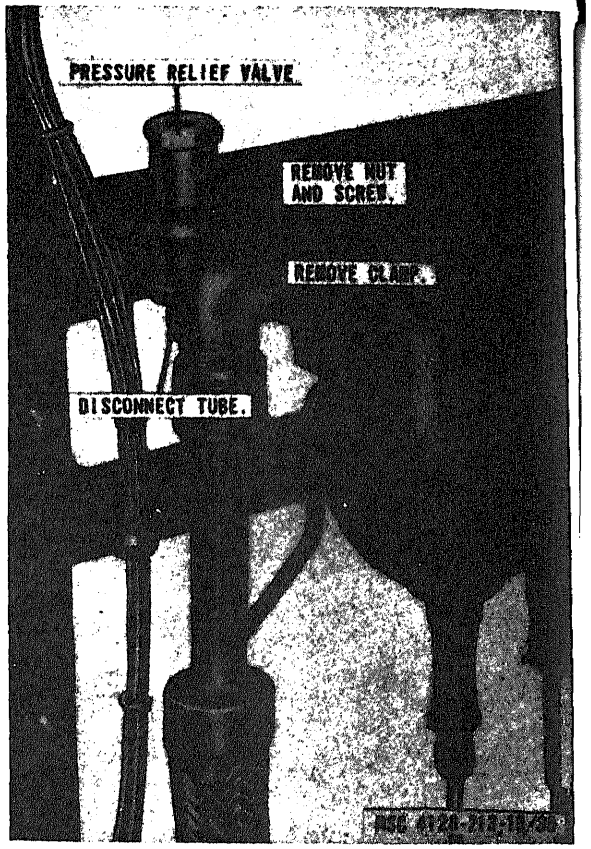
(1) Refer to figure 4-19 and install the thermoexpansion valve.

NOTE: DISCONNECT REFRIGERANT TUBES (3) (PAR. 4-30).


REMOVE HOT GAS SOLENOID BYPASS VALVE
ADAPTER
REMOVE ELECTRICAL CONNECTOR.
CONNECTOR PLUG

MEC 4120-210-15/4-15

Figure 4–15. Hot gas bypass solenoid valve, removal and installation.



MSC 4120-213-15/36

Figure 4–16. Pressure relief valve, removal and installation.

(2) Install the filter drier (para 4–27).

(3) Install evaporator section inspection cover (para 3–23).

4–39. Evaporator and Heater

a. Removal.

(1) Remove the air filter (para 3–9) (Models VEA4–3, VEA4–3–28029, and VEA4–3–28029MOD).

(2) Remove the turning vane (para 4–44) (Model VEA4–3–102103MOD).

(3) Remove the thermoexpansion valv (para 4–38).

(4) Refer to figure 4–20 and remove th evaporator and heater.

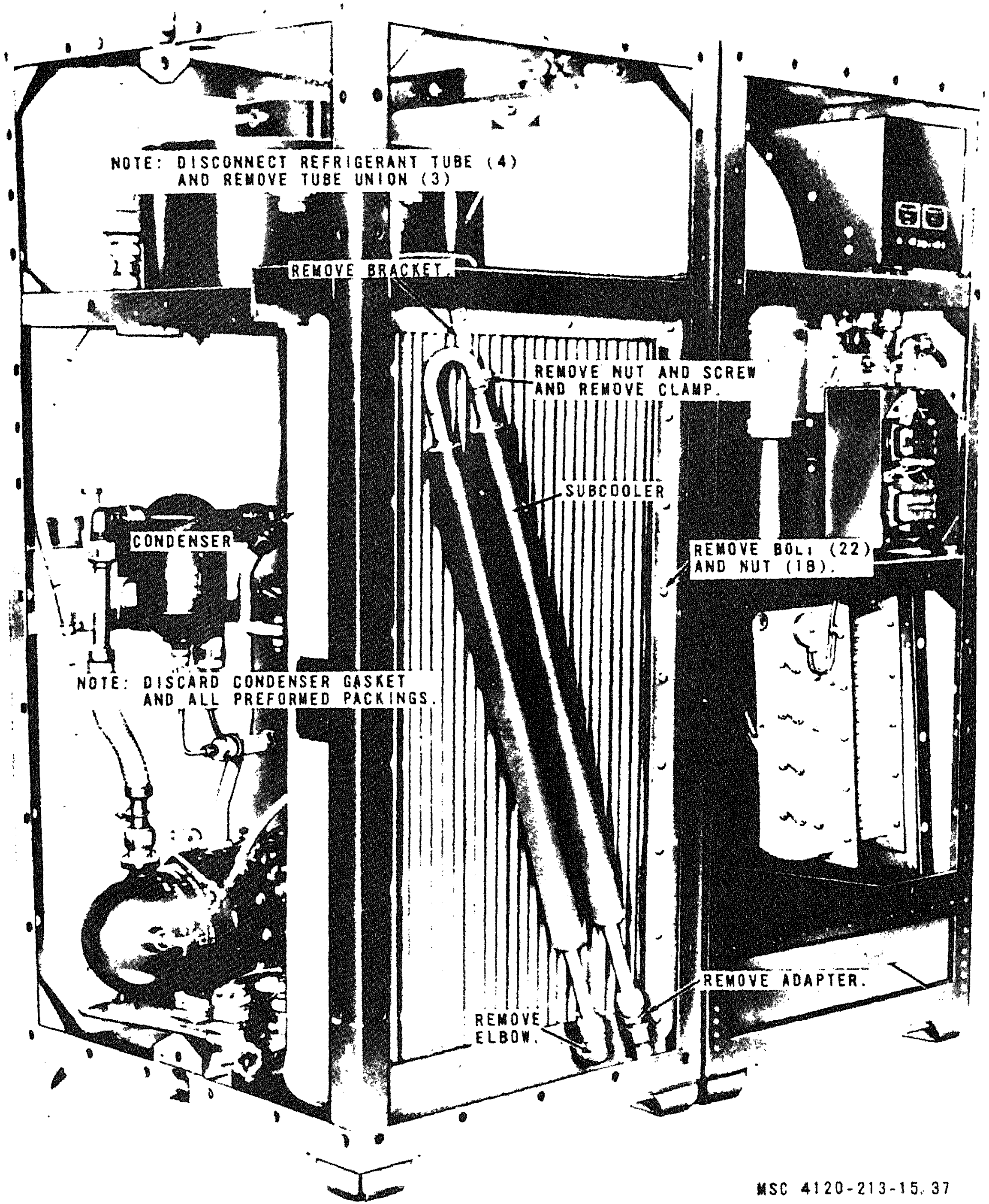
b. Installation.

(1) Refer to figure 4–20 and install t evaporator and heater.

(2) Install the thermoexpansion val (para 4–38).

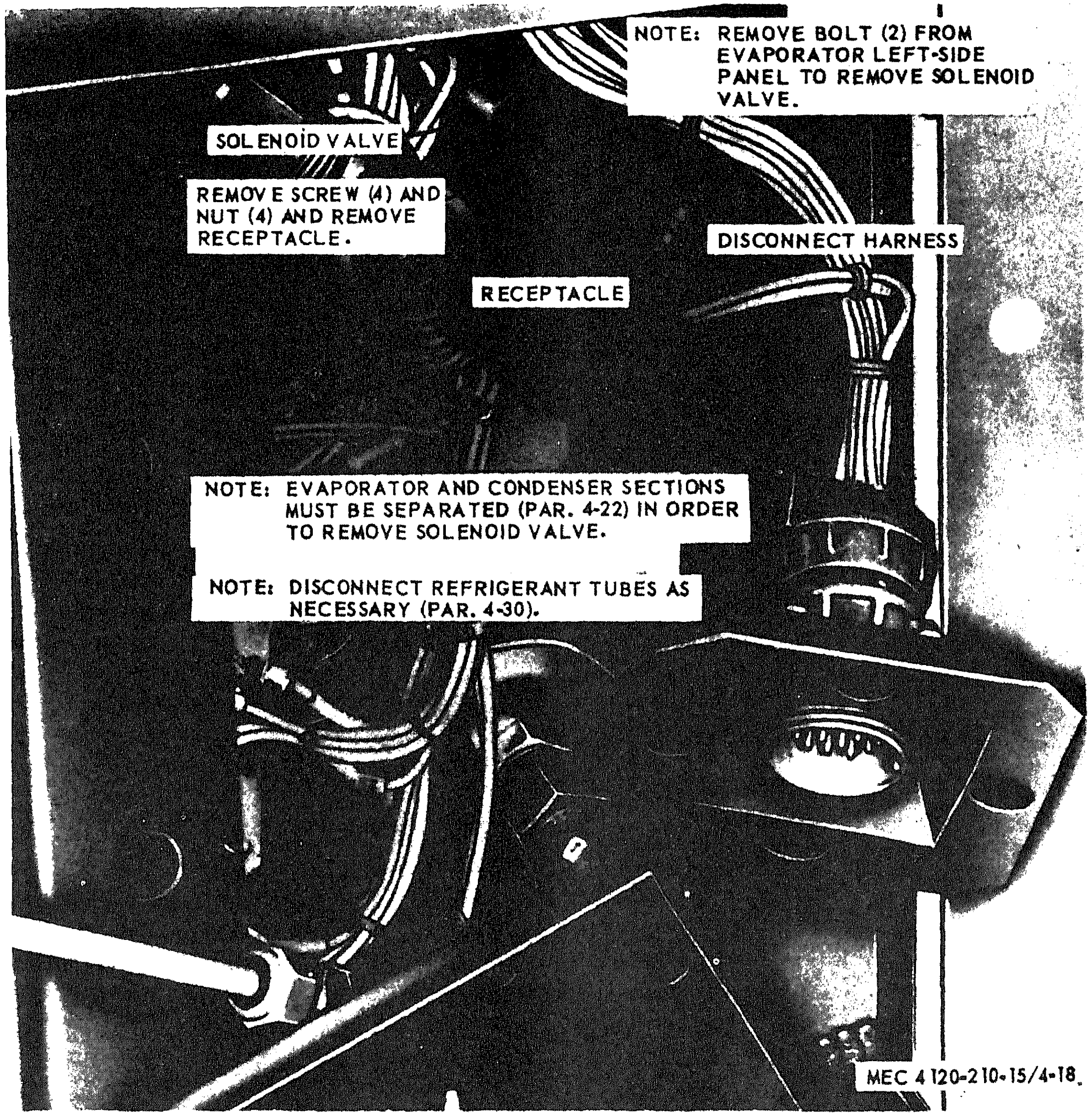
(3) Install the turning vane (para 4–44

(4) Install the air filter (para 3–9).


NOTE: DISCONNECT REFRIGERANT TUBE (4) AND REMOVE TUBE UNION (3)
REMOVE BRACKET.
REMOVE NUT AND SCREW AND REMOVE CLAMP.
SUBCOOLER
CONDENSER
REMOVE BOLT (22) AND NUT (18).
NOTE: DISCARD CONDENSER GASKET AND ALL PREFORMED PACKINGS.
REMOVE ADAPTER.
REMOVE ELBOW.

MSC 4120-213-15.37

Figure 4–17. Condenser and subcooler, removal and installation.



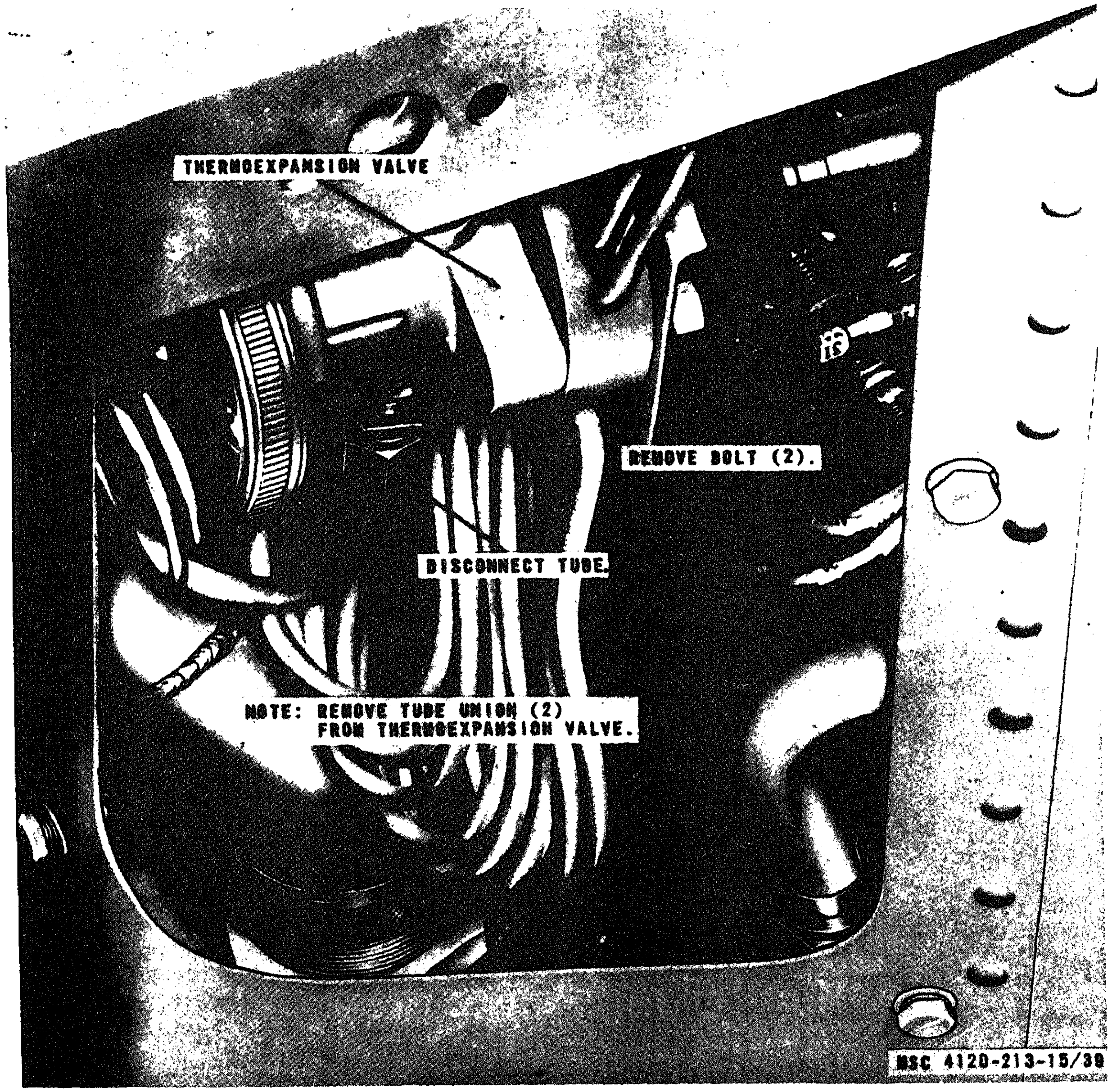
NOTE: REMOVE BOLT (2) FROM EVAPORATOR LEFT-SIDE PANEL TO REMOVE SOLENOID VALVE.

REMOVE SCREW (4) AND NUT (4) AND REMOVE RECEPTACLE.

NOTE: EVAPORATOR AND CONDENSER SECTIONS MUST BE SEPARATED (PAR. 4-22) IN ORDER TO REMOVE SOLENOID VALVE.

NOTE: DISCONNECT REFRIGERANT TUBES AS NECESSARY (PAR. 4-30).

Figure 4-18. Liquid refrigerant line solenoid valve, removal and installation.



REMOVE BOLT (2).

DISCONNECT TUBE.

NOTE: REMOVE TUBE UNION (2) FROM THERMOEXPANSION VALVE.

Figure 4-19. Thermoexpansion valve, removal and installation.

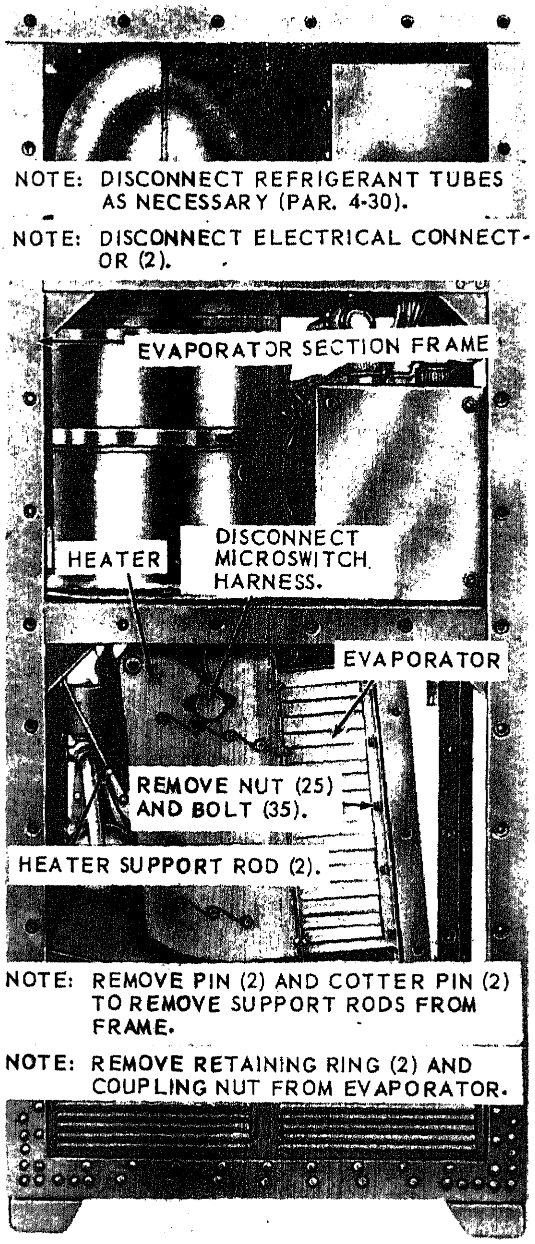

NOTE: DISCONNECT REFRIGERANT TUBES AS NECESSARY (PAR. 4-30).
NOTE: DISCONNECT ELECTRICAL CONNECTOR (2).
EVAPORATOR SECTION FRAME
HEATER
DISCONNECT MICROSWITCH HARNESS.
EVAPORATOR
REMOVE NUT (25) AND BOLT (35).
HEATER SUPPORT ROD (2).
NOTE: REMOVE PIN (2) AND COTTER PIN (2) TO REMOVE SUPPORT RODS FROM FRAME.
NOTE: REMOVE RETAINING RING (2) AND COUPLING NUT FROM EVAPORATOR.
MEC 4120-210-15/4-20

Figure 4-20. Evaporator and heater, removal and installation.

Section VII. AIR CIRCULATION SYSTEM

4-40. General

The air circulation system consists of two axial flow-type fan assemblies and the necessary ducts and controls for the system to perform its intended function of circulating air through the air conditioner. The evaporator fan, driven by an integral alternating current motor, circulates air to be cooled or heated through the evaporator section. On Models VEA4-3, VEA4-3-28029 and VEA4-3-28029-MOD fresh air is admitted into the evaporator section through the fresh air door, located on the rear side of the evaporator section. The quantity of fresh air admitted is controlled by the fresh air inlet door control assembly. The circulation of air over the external surfaces of the condenser is accomplished by the condenser fan. Air is drawn into the condenser section through the condenser and is forced out through opening provided in the condenser section top panel. On Models VEA4-3-102103 and VEA4-3-102103MOD flow of air through evaporator section is reversed in relation to other models, and the fresh air door and its control have been removed. Duct adapters, one at top front of evaporator section to receive air returning from compartment being conditioned, and one located at bottom of evaporator section left-side for the discharge of conditioned air, are provided. A turning vane is provided on Model VEA4-3-102103MOD to reduce blast pressure against discharge air duct adapter and is located in the discharge air outlet of evaporator section frame.

4-41. Evaporator Fan

a. On-Equipment Testing.

(1) Remove the evaporator section housing panels (para 3-23).

(2) Remove the plug connector from evaporator fan and see that 208-volt and 416-volt jumper plugs are installed as shown in figure 4-21.

(3) Assemble a test plug connector with leads connected to pins A, B, C, D, E, and H and install it in place of the removed plug.

(4) Use a multimeter and test between the leads A and B, A and C, and B and C. If continuity is not indicated on any of these tests an open circuit is indicated and the stator must be replaced.

(5) Use a megohmmeter and test between the fan housing and lead A. If the reading is less than 0.4 megohm the insulation is bad and the stator must be replaced.

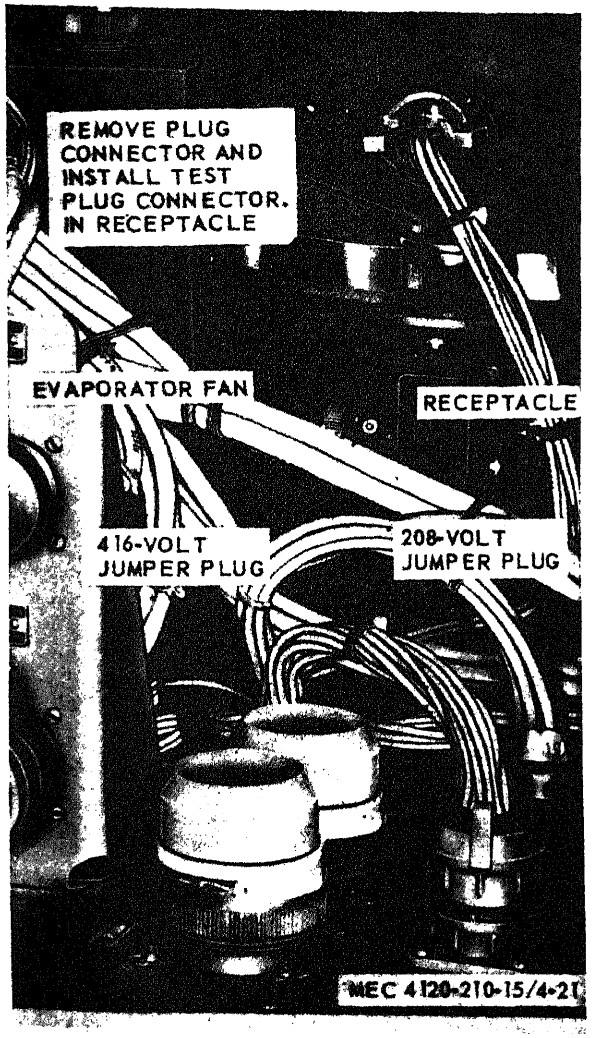


Figure 4-21. Evaporator fan, on-equipment test connection points.

(6) Remove 208-volt and 416-volt jumper plugs and test between leads A and H, B and H, and C and H. If reading is less than 0.4 megohm, the insulation is bad and the stator must be replaced.

(7) Test between terminals D and E with the multimeter. If continuity is indicated when fan ssembly is cold, the temperature limit switch is bad and must be replaced.

(8) Use the multimeter and test between the fan housing and leads D and E

in turn. If continuity is indicated, the temperature limit switch is grounded and must be replaced.

b. Removal.

(1) Remove evaporator section housing panels (para 3-23).

(2) Disconnect plug connector (*a*(2) above)).

(3) Refer to figure 4-22 and remove evaporator fan.

c. Disassembly. Refer to figure 4-23 and disassemble the evaporator fan.

d. Testing. Refer to TM 5-764 and test the stator for short circuits.

e. Reassembly. Refer to figure 4-23 and reassemble the evaporator fan.

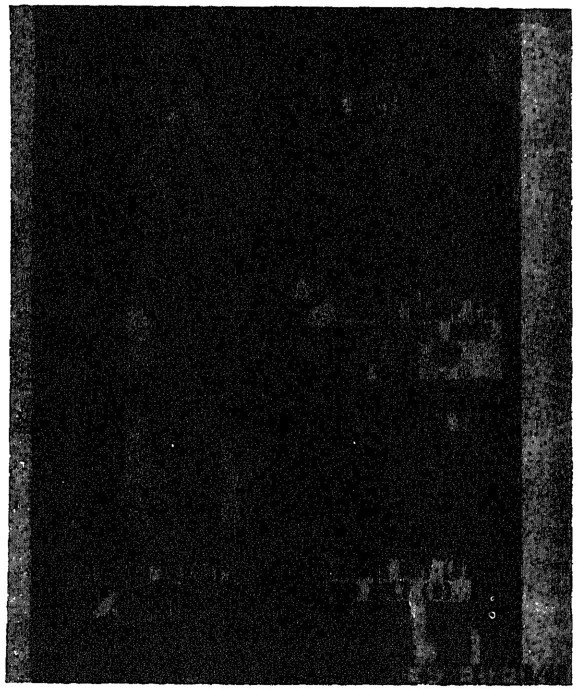


Figure 4-22. Evaporator fan, removal and installation.

f. Installation.

(1) Refer to figure 4-22 and install the evaporator fan.

(2) Install evaporator section housing panels (para 3-23).

4-42. Condenser Fan

a. On - Equipment Testing. Perform on-equipment testing in a manner similar to that described in paragraph 4-41.

b. Removal.

(1) Remove the condenser section housing panels (para 3-23).

(2) Refer to figure 4-24 and remove the condenser fan.

c. Disassembly.

Note. Although some component parts of the condenser fan and evaporator fan assemblies differ, both are disassembled in the same manner.

Refer to figure 4-23 and disassemble the condenser fan.

d. Testing. Refer to TM 5-764 and test the stator for short circuits.

e. Reassembly. Refer to figure 4-23 and reassemble the condensor fan.

f. Installation.

(1) Refer to figure 4-24 and install the condenser fan.

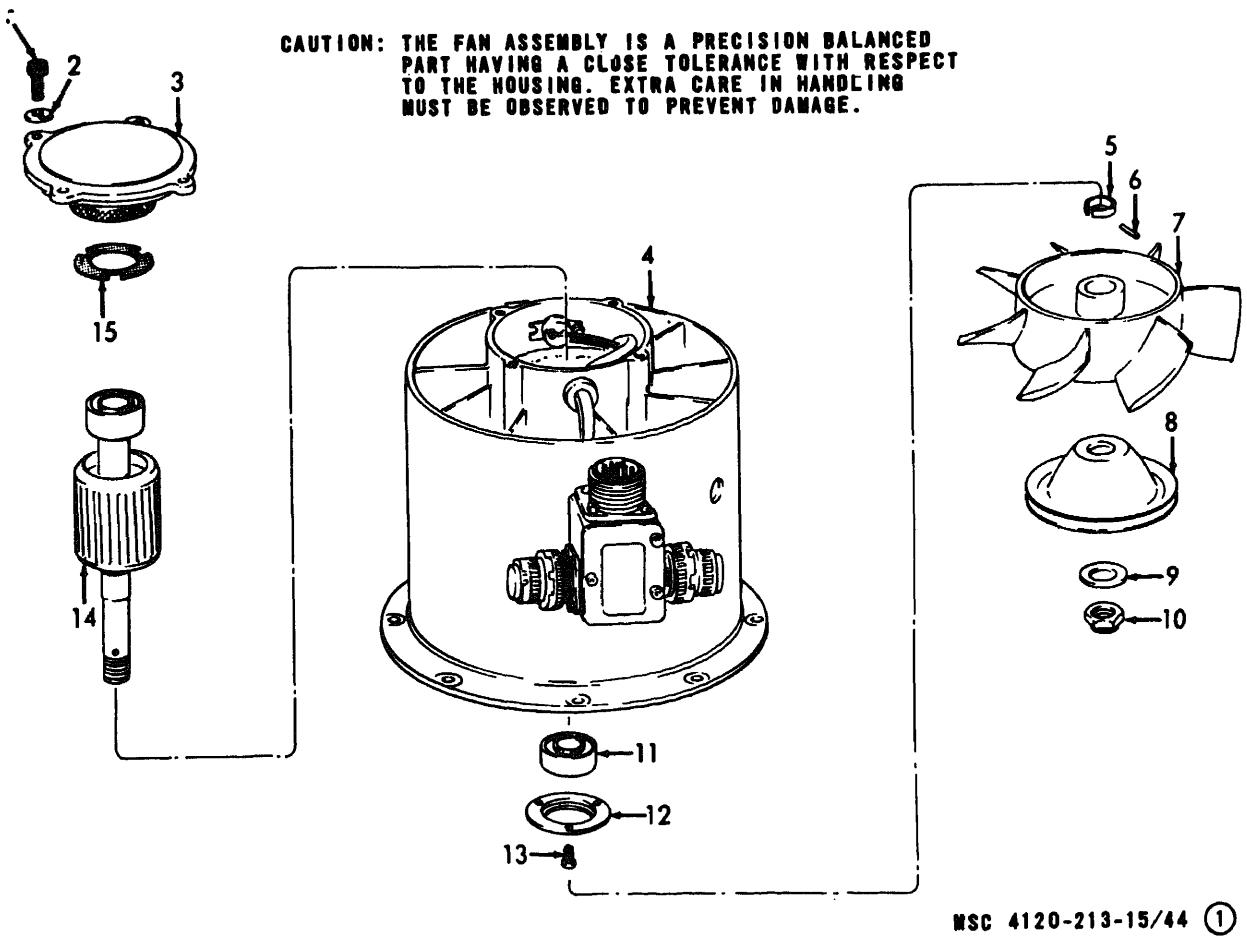
(2) Install the condenser housing panels (para 3-23).

4-43. Discharge Air Duct Adapter (Models VEA4-3-102103 and VEA4-3-102103MOD)

Refer to figure 4-25 for removal and installation of discharge air duct adapter.

4-44. Turning Vane (Model VEA4-3-102103MOD)

Refer to figure 4-25 for removal and installation of turning vane.



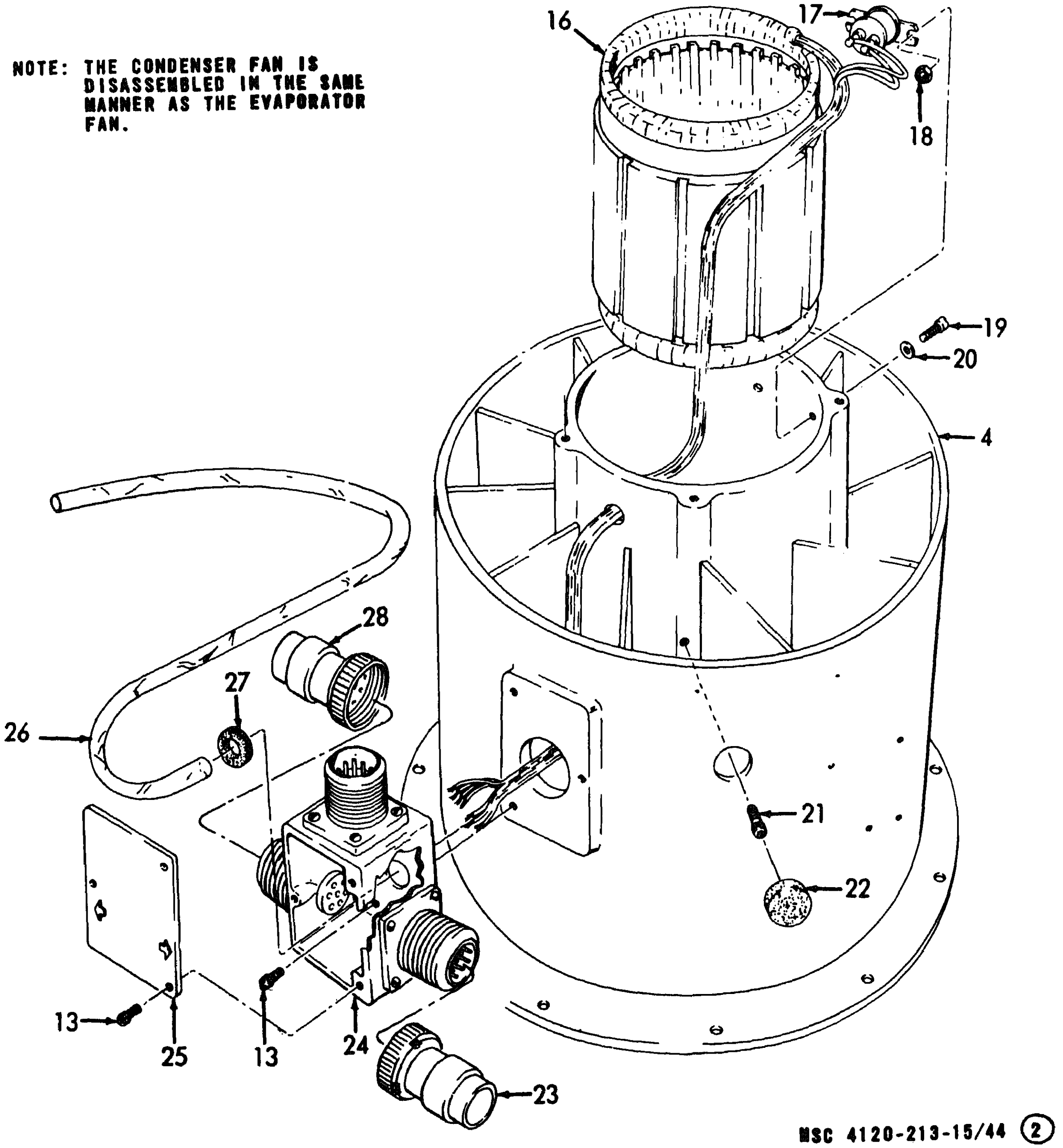
CAUTION: THE FAN ASSEMBLY IS A PRECISION BALANCED PART HAVING A CLOSE TOLERANCE WITH RESPECT TO THE HOUSING. EXTRA CARE IN HANDLING MUST BE OBSERVED TO PREVENT DAMAGE.

MSC 4120-213-15/44 ①

1	Screw	6	Spring pin	11	Ball bearing
2	Washer	7	Evaporator fan	12	Bearing retainer
3	Front head	8	Rotor fairing	13	Screw
4	Fan motor housing	9	Washer	14	Rotor assembly
5	Rotor shaft spacer	10	Nut	15	Loading spring

Fan (Models VEA4-3, VEA4-3-28029, and VEA4-3-28029MOD)

Figure 4-23. Evaporator fan, disassembly, and reassembly.

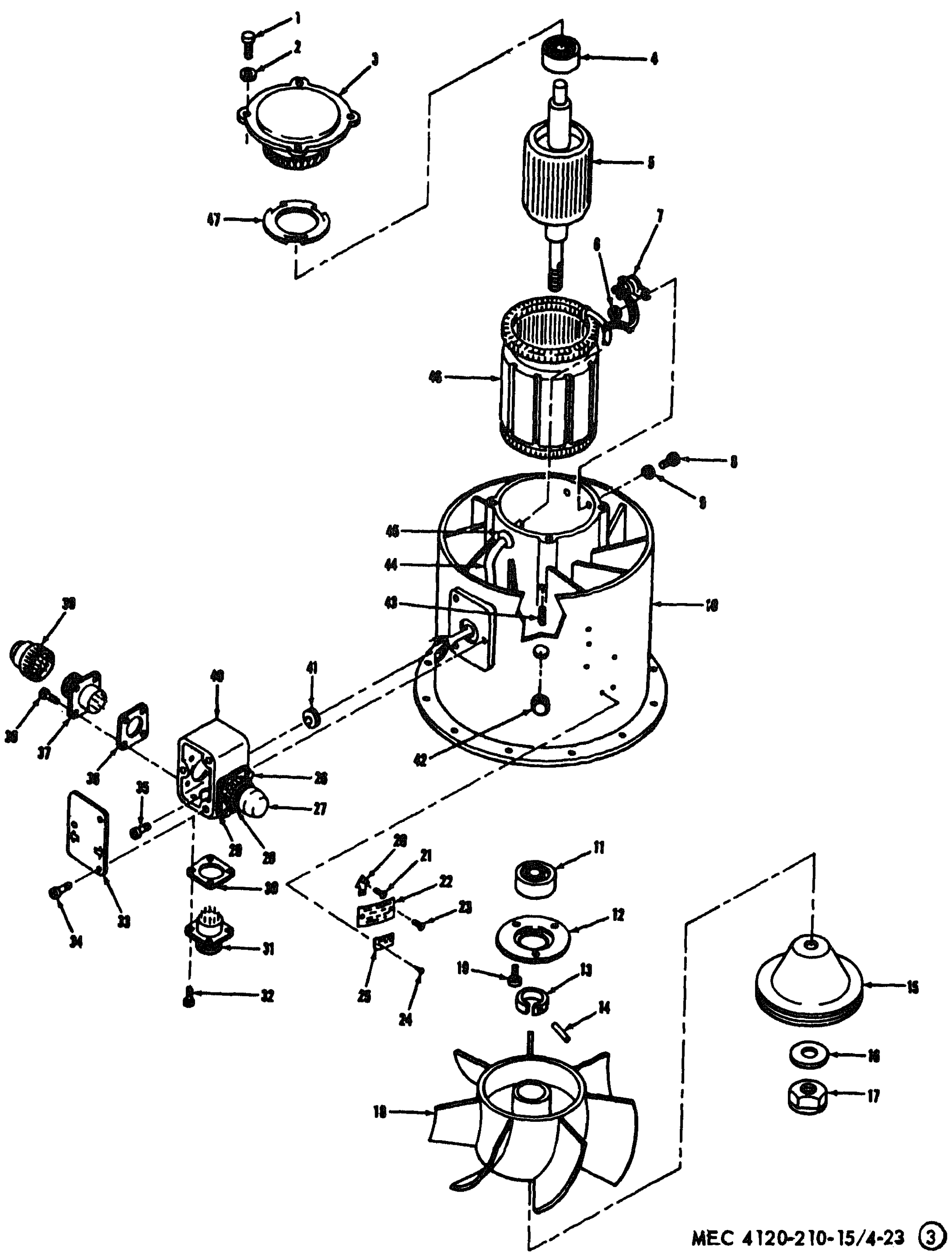


NOTE: THE CONDENSER FAN IS DISASSEMBLED IN THE SAME MANNER AS THE EVAPORATOR FAN.

16	Stator assembly	21	Setscrew	26	Extruded tubing
17	Temperature limit switch	22	Rubber plug	27	Rubber grommet
18	Nut	23	Jumper plug (208-v)	28	Jumper plug (416-v)
19	Screw	24	Connector box		
20	Washer	25	Connector box cover		

Motor

Figure 4-23—Continued.



Screw
Washer
Front head

4 Ball bearing
5 Rotor
6 Nut

7 Temperature limit switch
8 Screw
9 Washer

Fan (Models VEA4-8-102108 and VEA4-8-102108MOD)

Figure 4-23—Continued.

10 Fan housing
11 Ball bearing
12 Bearing retainer
13 Rotor spacer
14 Spring pin
15 Rotor fairing
16 Washer
17 Nut
18 Condenser fan
19 Capscrew
20 Identification plate
21 Screw
22 Identification plate

23 Screw
24 Screw
25 Identification plate
26 Screw
27 Jumper plug (416 v)
28 Receptacle
29 Gasket
30 Gasket
31 Receptacle
32 Screw
33 Outlet cover box
34 Screw
35 Screw

36 Gasket
37 Receptacle
38 Screw
39 Jumper plug (208v)
40 Outlet box
41 Grommet
42 Plug
43 Setscrew
44 Tube
45 Grommet
46 Stator assembly
47 Loading spring

Figure 4-23—Continued.

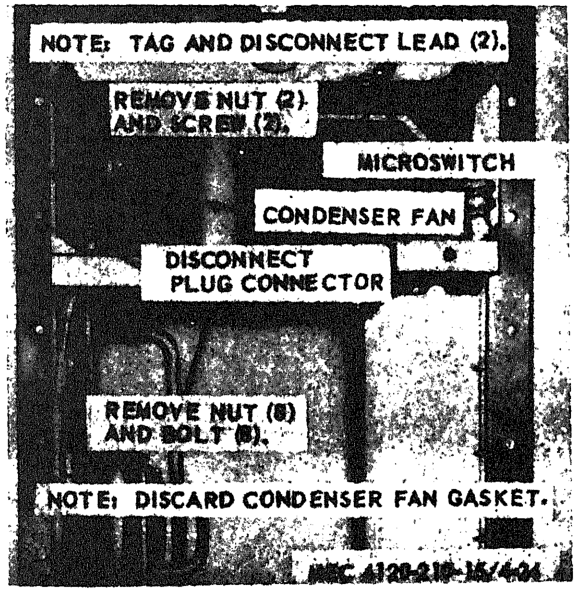
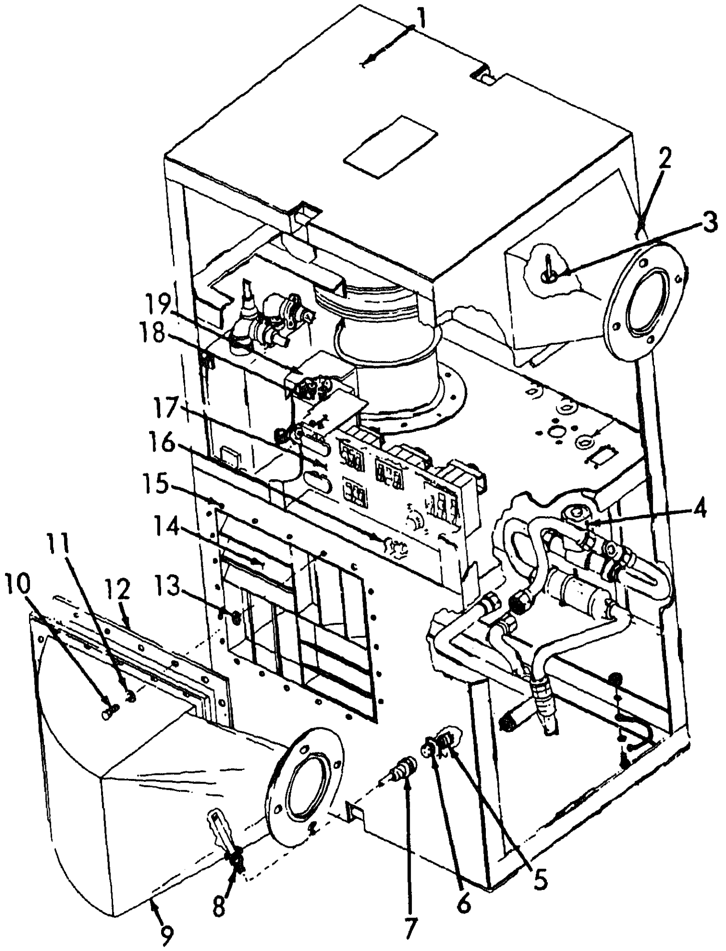

NOTE: TAG AND DISCONNECT LEAD (2).
REMOVE NUT (2) AND SCREW (2).
MICROSWITCH
CONDENSER FAN
DISCONNECT PLUG CONNECTOR
REMOVE NUT (8) AND BOLT (8).
NOTE: DISCARD CONDENSER FAN GASKET.
MEC 4120-210-15/4-24

Figure 4-24. Condenser fan and microswitch, removal and installation.



MEC 4120-210-15/4-25

1	Evaporator section	7	Plug, electrical connector	14	Turning vane
2	Return air duct adapter	8	Discharge air thermostat	15	Anchor nut (20 rqr)
3	Return air thermostat	9	Discharger air duct adapter	16	Fuse, spare
4	Liquid line solenoid valve	10	Bolt (20 rqr)	17	Master circuit breaker control panel
5	Discharge air thermostat wiring harness	11	Washer (20 rqr)	18	Center tap
6	Through bulkhead connector	12	Gasket	19	Transformer
		13	Screw (4 rqr)		

Figure 4-25. Discharge air duct adapter and turning vane, removal and installation.

Section VIII. ELECTRICAL SYSTEM

4-45. General

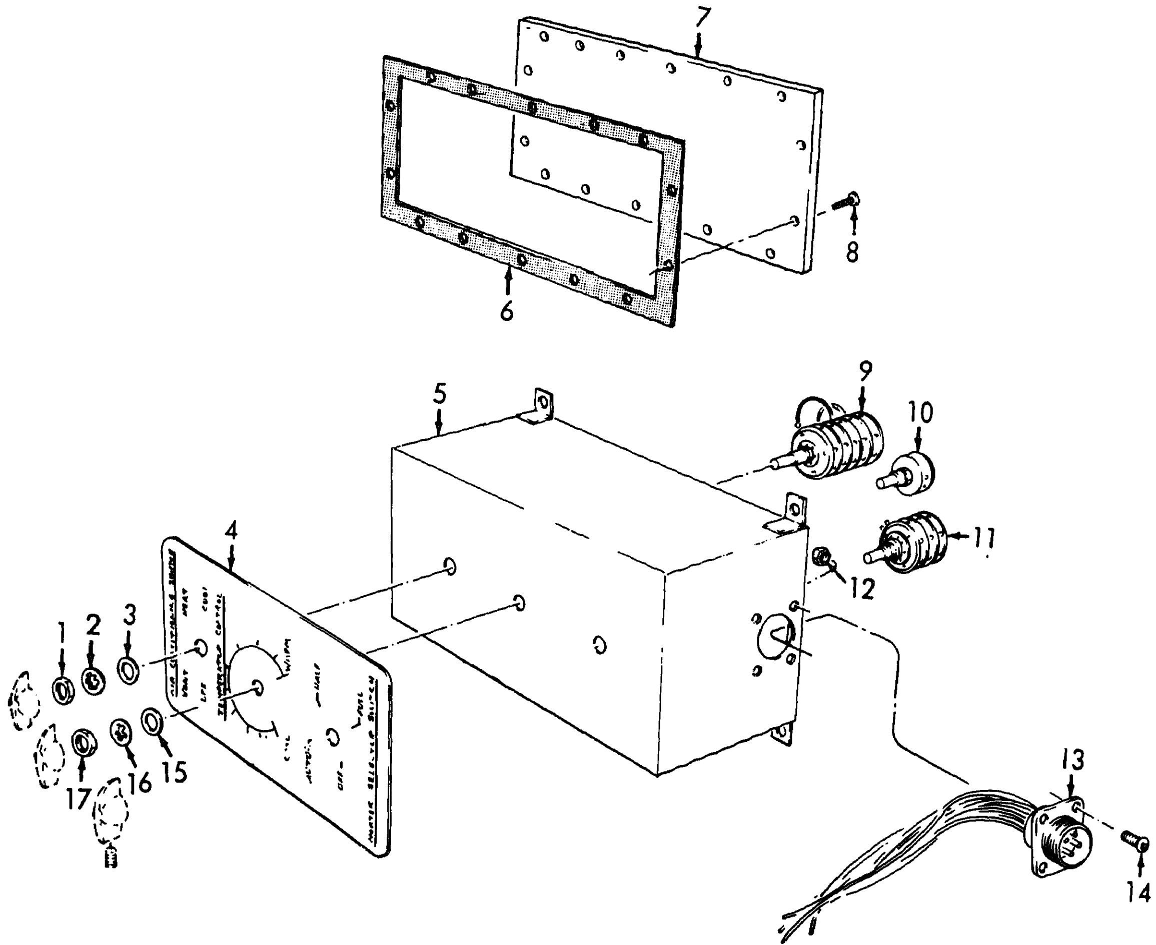
Model VEA4-3 operates on 416-volts, remaining models operate on 208-volts. Both power sources must be 3-phase, 400-cycle, ac, with a minimum output of 15 kw. The various control circuits, incorporating relays, safety cutout devices, and controls, operate on 28-volts dc supplied by the power transformer and rectifier mounted behind the master circuit breaker panel. The wiring harness assemblies have pin-type, thread plug connectors and receptacles. Overload protection for the motors is provided by the circuit breakers in the master circuit breaker control panel and by temperature limit switches which are integral parts of each motor.

Warning: **The operating voltage of the air conditioners is dangerous to persons coming in contact with the electrical system. Disconnect the power source before performing maintenance, tests, or replacement of any electrical system component.**

4-46. Remote Control Assembly (Models VEA4-3, VEA4-3-28029, and VEA4-2-38029MOD)

a. Removal. Remove the remote control assembly (para 3-31).

b. Refer to figure 4-26 and disassemble the remote control assembly.

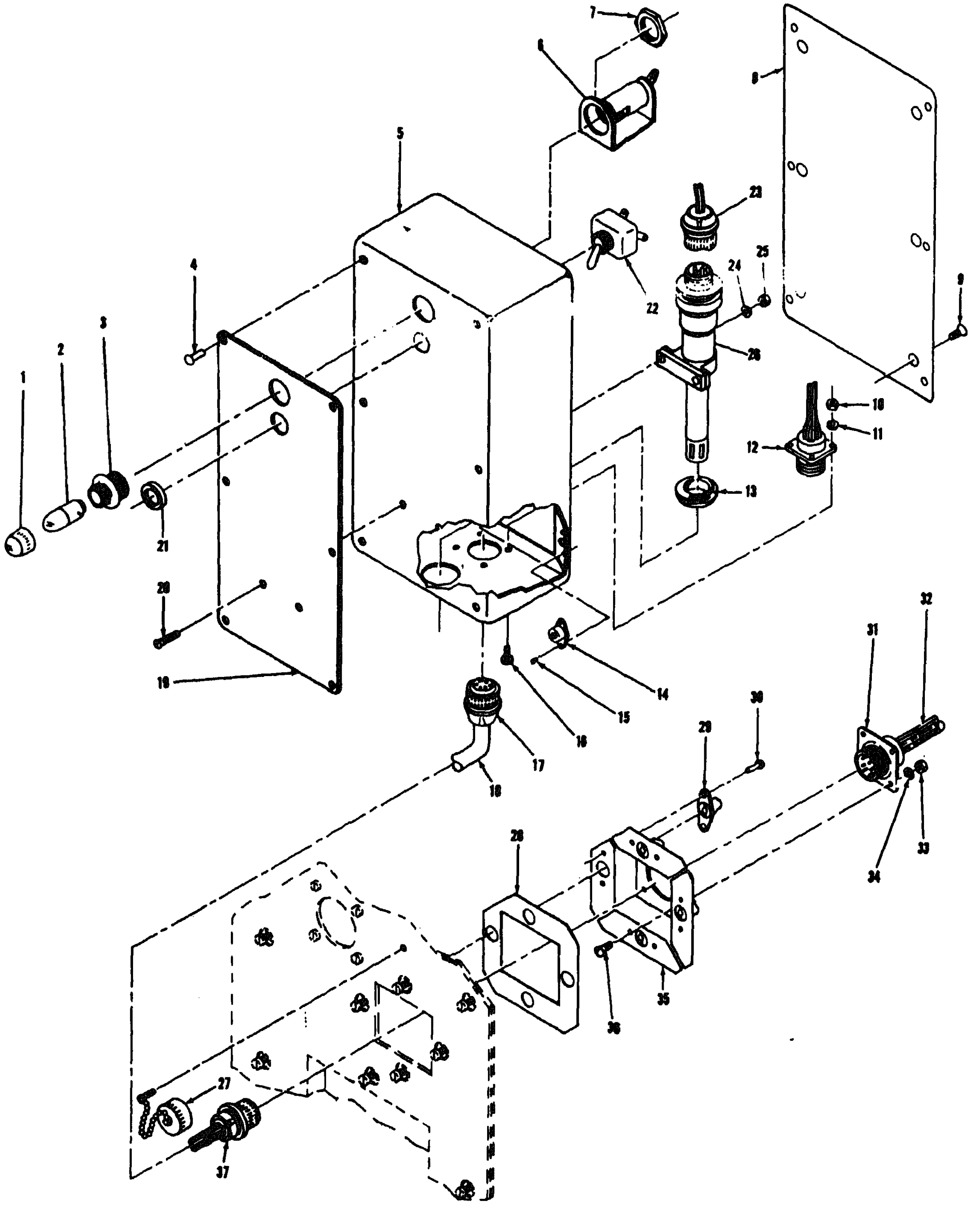


MSC 4120-213-15/46

1	Nut	7	Cover	13	Wiring harness
2	Washer	8	Screw	14	Screw
3	Washer	9	Air conditioning switch	15	Washer
4	Switch plate	10	Variable resistor	16	Washer
5	Remote control box	11	Heater selector switch	17	Nut
6	Gasket	12	Nut		

Model VEA4-3

Figure 4-26. Remote control assembly, disassembly and reassembly.



NSC 4120-217-15/30

Models VEA4–3–28029 and VEA4–3–28029MOD
Figure 4–26—Continued

1	Lens
2	Indicator light
3	Light holder
4	Rivet
5	Box assembly
6	Socket
7	Nut
8	Cover
9	Screw
10	Nut
11	Washer
12	Receptacle
13	Grommet
14	Nut plate
15	Rivet
16	Screw
17	Plug connector
18	Wiring harness
19	Instruction plate
20	Screw
21	Nut
22	Switch
23	Plug connector
24	Washer
25	Nut
26	Remote thermostat
27	Dust cap
28	Gasket
29	Receptacle
30	Rivet
31	Receptacle
32	Wiring harness
33	Nut
34	Washer
35	Mount
36	Screw
37	Plug thermostat

Figure 4–26—Continued.

c. Testing (Model VEA4–3).

(1) *Variable resistor.*

(*a*) Rotate the variable resistor shaft to a maximum resistance position.

(*b*) Use a multimeter and test between the single terminal and either of the two terminals joined by the jumper wire. A reading of 5 percent above or below 5,000 ohms indicates a faulty variable resistor. Replace the resistor.

(*c*) With the probes of the multimeter in the same position as in (*b*) above, rotate the variable resistor shaft counterclockwise. A steady and consistant decrease in resistance from 5,000 ohms to 0 must be indicated. Replace a defective resistor.

(2) *Wiring harness.* Refer to the wiring diagram (fig. 4–1) and test the leads of the wiring harness by touching the probes of a multimeter to each end of the leads. If continuity is not indicated the lead is defective and the wiring harness must be replaced.

d. Testing (Models VEA4–3–28029 and VEA4–3–28029MOD).

(1) *Remote thermostat.* Test the remote thermostat (para 3–34).

(2) *On-off switch (Model VEA4–3–28029).* Use a multimeter and test switch for continuity by connecting the probes of the multimeter between the terminals of the switch. If continuity is not indicated when the switch is actuated, the switch is defective and must be replaced.

(3) *Selector switch (Model VEA4–3–28029MOD).* Test the switch for continuity in a manner similar to that in (2) above.

(4) *Wiring Harness.* Test wiring harness as indicated in *c*(2) above.

e. Reassembly. Refer to figure 4–26 and reassemble the remote control assembly.

f. Installation. Install remote control assembly (para 3–31).

4–47. Externally Mounted Control Panel (Model VEA4–3–102103)

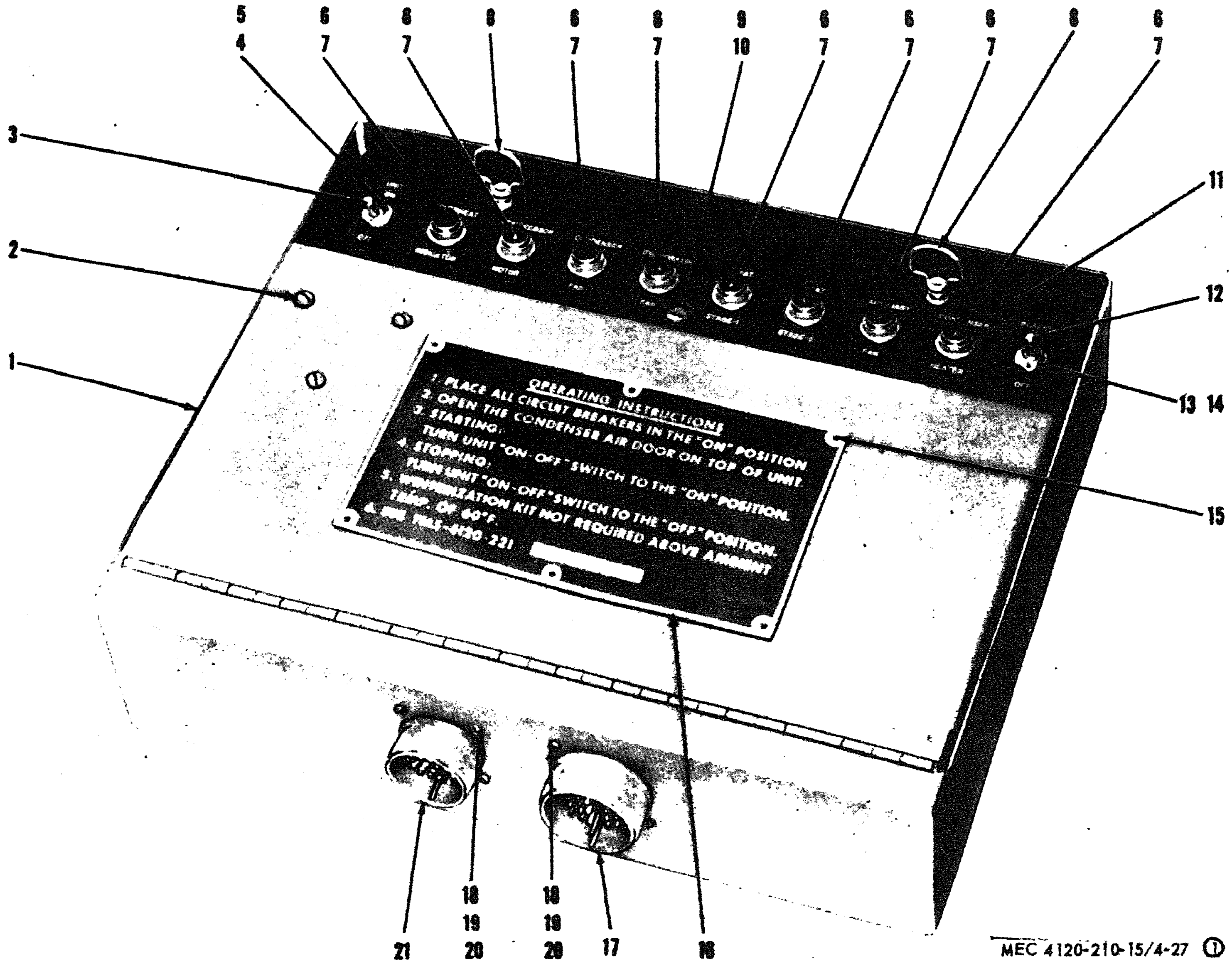
a. Removal. Remove the externally mounted control panel (para 3–32).

b. Disassembly.

(1) Remove the fuse (para 3–8).

(2) Refer to figure 4–27 and disassemble the externally mounted control panel.

***Caution:* Because of high thermal conductivity of the silver leads, be careful not to damage the rectifiers when unsoldering. It is recommended that a heat sink, such as a long-nose pliers, be applied between the point of solder and the rectifier body. If possible, keep the leads from direct contact with the soldering-iron tip, and complete the unsoldering operation within 5 seconds.**


1
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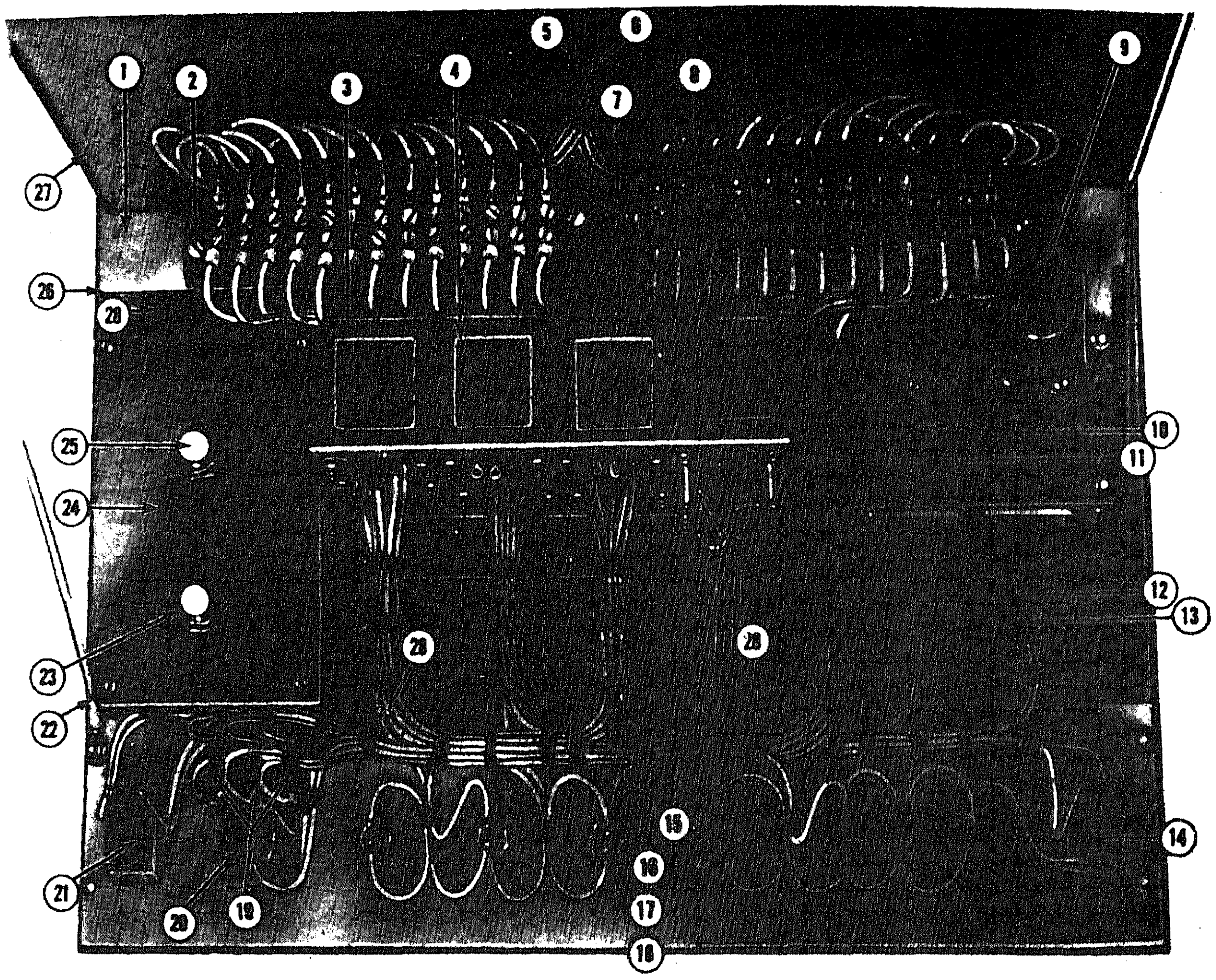
21
OPERATING INSTRUCTIONS
1. PLACE ALL CIRCUIT BREAKERS IN THE "ON" POSITION.
2. OPEN THE CONDENSER AIR DOOR ON TOP OF UNIT.
3. STARTING:
TURN UNIT "ON-OFF" SWITCH TO THE "ON" POSITION.
4. STOPPING:
TURN UNIT "ON-OFF" SWITCH TO THE "OFF" POSITION.
5. WINTERIZATION KIT NOT REQUIRED ABOVE AMBIENT TEMP. OF 60°F.
OFF
MEC 4120-210-15/4-27 ①

Figure 4–27. Externally mounted control panel, disassembly and reassembly (Model VEA4–3–102108).

1 Control panel box
2 Screw
3 Unit switch
4 Nut
5 Washer
6 Indicator lens cap
7 Indicating light lamp
8 Bail handle stud
9 Fuse
10 Fuse cap
11 Identification plate
12 Blackout switch
13 Washer
14 Nut
15 Rivet
16 Instruction plate
17 Receptacle
18 Nut
19 Washer
20 Screw
21 Receptacle

Figure 4–27—Continued.



MEC 4120-210-15 4-28

1	Modular plate	11	Wiring harness, front	21	Switch, toggle
2	Terminal board (2 rqr)	12	Electrical connector plug	22	Door support cable
3	Reversing relay	13	Electrical connector plug	23	Variable resistor
4	Auxiliary heater relay	14	Toggle switch	24	Instruction plate
5	Clamp	15	Standoff insulator (2 rqr)	25	Variable resistor
6	Wiring harness, rear	16	Nut	26	Control panel cover
7	Auxiliary condenser fan relay	17	Washer	27	Control panel box
8	Mode relay	18	Indicator light (7 rqr)	28	Anchor nuts (4 rqr)
9	Heating-cooling relay	19	Diodes (3 rqr)		
10	Temperature control box	20	Micarta plate, diode mounting		

Figure 4-28. Externally mounted control panel, disassembly and reassembly (Model VEA4-3-102103MOD).

C2 and C3, D2 and D3, E2 and E3, and F2 and F3. If continuity is not indicated, the relay is defective and must be replaced.

(*b*) Energize the relay by applying 28-volt dc between terminals X1 and X2. Using a multimeter, test for continuity between terminals A2 and A1, B2 and B1, C2 and C1, D2 and D1, E2 and E1, and F2 and F1. If continuity is indicatd the relay is defective and must be replaced.

(2) *Auxiliary condenser fan and heater relays.*

(*a*) Use a multimeter and test between terminals A2 and A3, B2 and B3, C2 and C3, and D2 and D3. If continuity is not indicated the relay is defective and must be replaced.

(*b*) Energize the relay by applying 28-volt dc between terminals X1 and X2, Using a multimeter, test for continuity between terminals A2 and A1, B2 and B1, C2 and C1, and D2 and D. If continuity is indicated the relay is defective and must be replaced.

(3) *Reversing relay.*

(*a*) Use a multimeter and test between terminals A2 and A3 and B2 and B3. If continuity is not indicated the relay is defective and must be replaced.

(*b*) Energize the relay by applying 28-volt dc between terminals X1 and X2. Using a multimeter, test for continuity between terminals A2 and A1 and B2 and B1. If continuity is indicated the relay is defective and must be replaced.

(4) *Variable resistors.* Refer to pargraph 4-46*c*(1) and test the variable resistors.

(5) *Wiring harness.* Refer to paragraph 4-46*c*(2) and test the wiring harness.

d. Reassembly. Reassemble the externally mounted control panel by reversing order of disassembly.

e. Installation. Install externally mounted control panel (para 3-32).

4-49. Magnetic Amplifier Temperature Control (Model VEA4-3-102103)

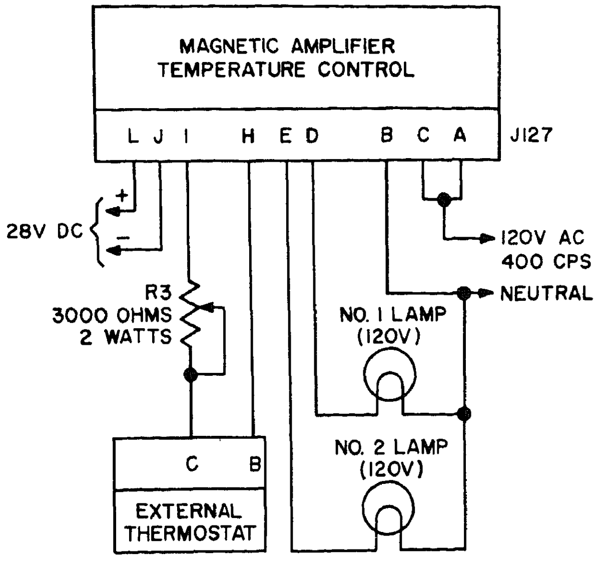
a. Removal. Remove the magnetic amplifier temperature control (para 4-47).

b. Testing.

(1) Connect the magnetic amplifier temperature control as shown in figure 4-29.

(2) Set variable resistor R3 to 750 ohms.

(3) Warm the external thermostat by immersing the thermostat probe in water which has been heated to 78°F.



NOTE:
USE THE EXTERNAL THERMOSTAT OF THE AIR CONDITIONER ELECTRICAL SYSTEM FOR THIS TEST.

MEC 4120-210-15/4-29

Figure 4-29. Magnetic amplifier temperature control, test connection diagram.

(4) Adjust the variable resistor on the magnetic amplifier temperature control until the No. 1 and No. 2 lamps stop glowing.

(5) Warm the thermostat by immersing the thermostat probe in water which has been heated to 85°F. Observe that the No. 1 lamp glows.

Note. The No. 1 and No. 2 lamps should never glow at the same time.

(6) Cool the thermostat by immersing the thermostat probe in water which has been cooled to 60°F.

(7) Adjust variable resistor R3 until No. 1 lamp stops glowing and the No. 2 lamp glows. The resistance of variable resistor R3 should now be approximately 1,200 ohms.

Note. If any of the indications is not obtained, the magnetic amplifier temperature control is defective and must be replaced.

(8) Disconnect the magnetic amplifier temperature control.

c. Installation. Install the magnetic amplifier temperature control (para 4-47).

4-50. Repeat Cycle Timer (Model VEA4-3-102103)

a. Removal. Remove the repeat cycle timer (para 4-47).

b. Testing.

(1) Using a multimeter, test between terminals M and L, C and B, and D and E of repear cycle timer. If continuity E of repeat cycle timer. If continuity is not indicated the timer is defective and must be replaced.

(2) Using a multimeter, test between terminals A and C, F and H, H and J, H and K, and J and K. If continuity is indicated, the timer is defective and must be replaced.

c. Installation. Install the repeat cycle timer (para 4-47).

4-51. Heater Control Assembly

a. Removal.

(1) Remove the evaporator section rear and right side panels (para 3-23).

(2) Refer to figure 4-30 and remove the heater control assembly.

b. Testing.

(1) Use a multimeter and test for continuity between pin B of J-111 and pin D of J-113. Then test between pin F of J-111 and C of J-113. If continuity is indicated on either of the tests, replace the upper heater control relay.

Note. Reference numbers J-111 and J113 are identification numbers of the wiring harness receptacles that are secured in the top of the heater control assembly. The numbers are located on the control box next to their respective receptacles. Viewing the control box from the cover side, J-111 is on the left and J-113 is on the right side.

(2) Use the multimeter and test between pins G and H of J-111. If continuity is not indicated, the wiring harness is defective and must be replaced.

(3) Use the multimeter and test between pin G of J-111 and pin A of J-113. Then test between pin I of J-111 and pin E of J-113. If continuity is indicated on either of these tests, replace the lower heater control relay.

(4) Energize the upper heater control relay by connecting a source of 28-volt dc between pins A and E of J-111. Use the multimeter and test for continuity between pin B of J-111 and D of J-113. Then test between pin F of J-111 and C of J-113. If continuity is not indicated on both of these tests, replace the upper heater control relay. Remove the 28-volts dc from pins A and E of J-111.

(5) Connect a source of 28-volts dc between pins A and D of J-11. Use a a multimeter and test between pins G of J-111 and G of J-113. Then test between pins I of J-111 and E of J-113. If continuity is not indicated on both tests, replace the lower heater control relay. Remove the 28-volts dc from pins A and D of J-111.

(6) Connect a multimeter between pins I of J-111 and E of J-113. Connect pins A and C of J-111. Connect a source of 28-volts dc between pins A and E of J-111. After a delay of 3 seconds, the multimeter should indicate continuity. If the multimeter does not indicate continuity after 3 seconds, replace the time delay relay.

c. Disassembly and Reassembly. Refer to figure 4-31, disassemble and reassemble the heater control assembly.

d. Installation.

(1) Refer to figure 4-30 and install the heater control assembly.

(2) Install the evaporator section rear and right side panels (para 3-23).

4-52. Motor Control Assembly

a. Removal.

(1) Remove the evaporator section rear and right side panels (para 3-23).

(2) Refer to figure 4-30 and remove motor control assembly.

b. Disassembly. Refer to figure 4-32 and disassemble the motor control assembly.

Note. Although some components differ on the various models, all are disassembled in the same manner.

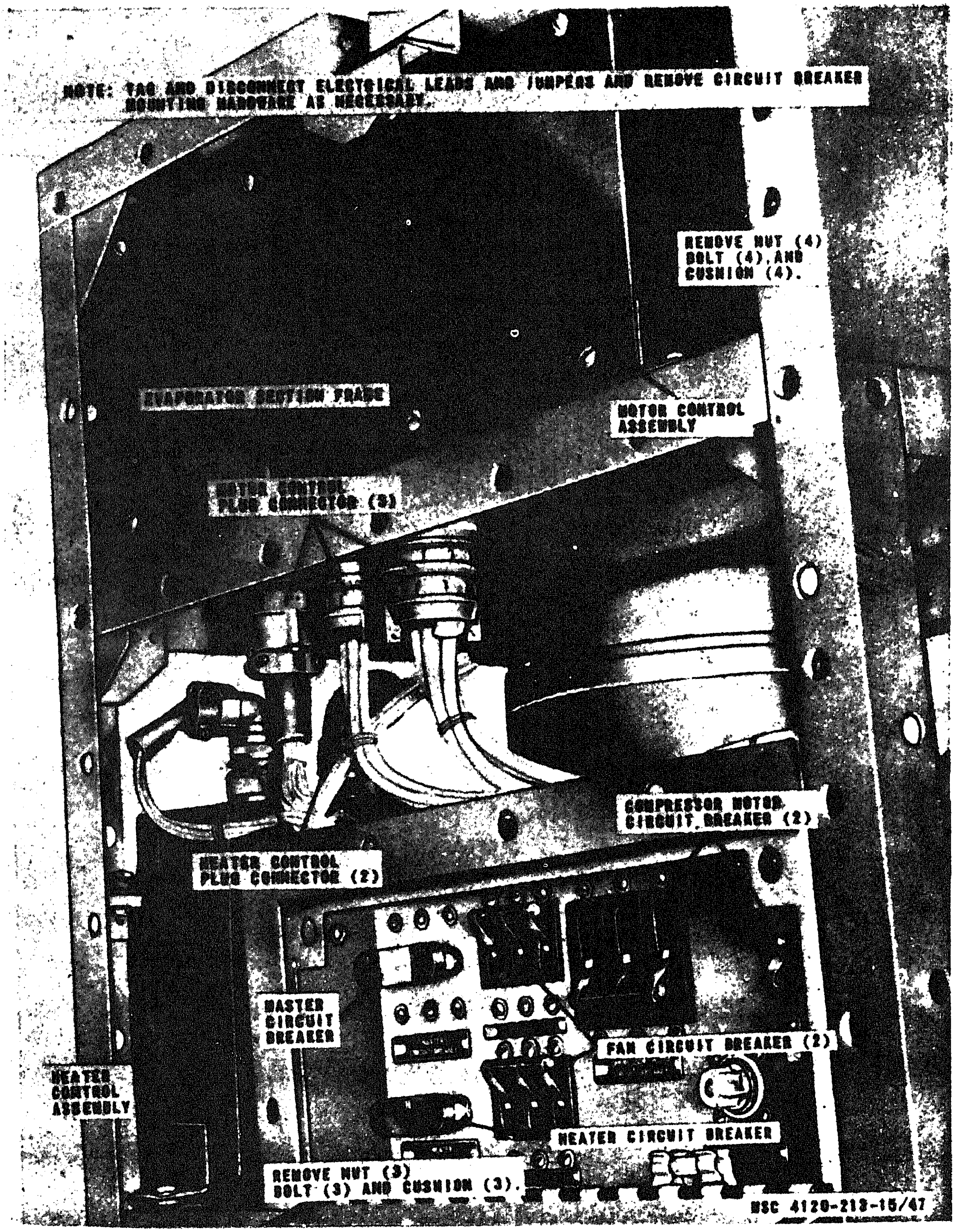
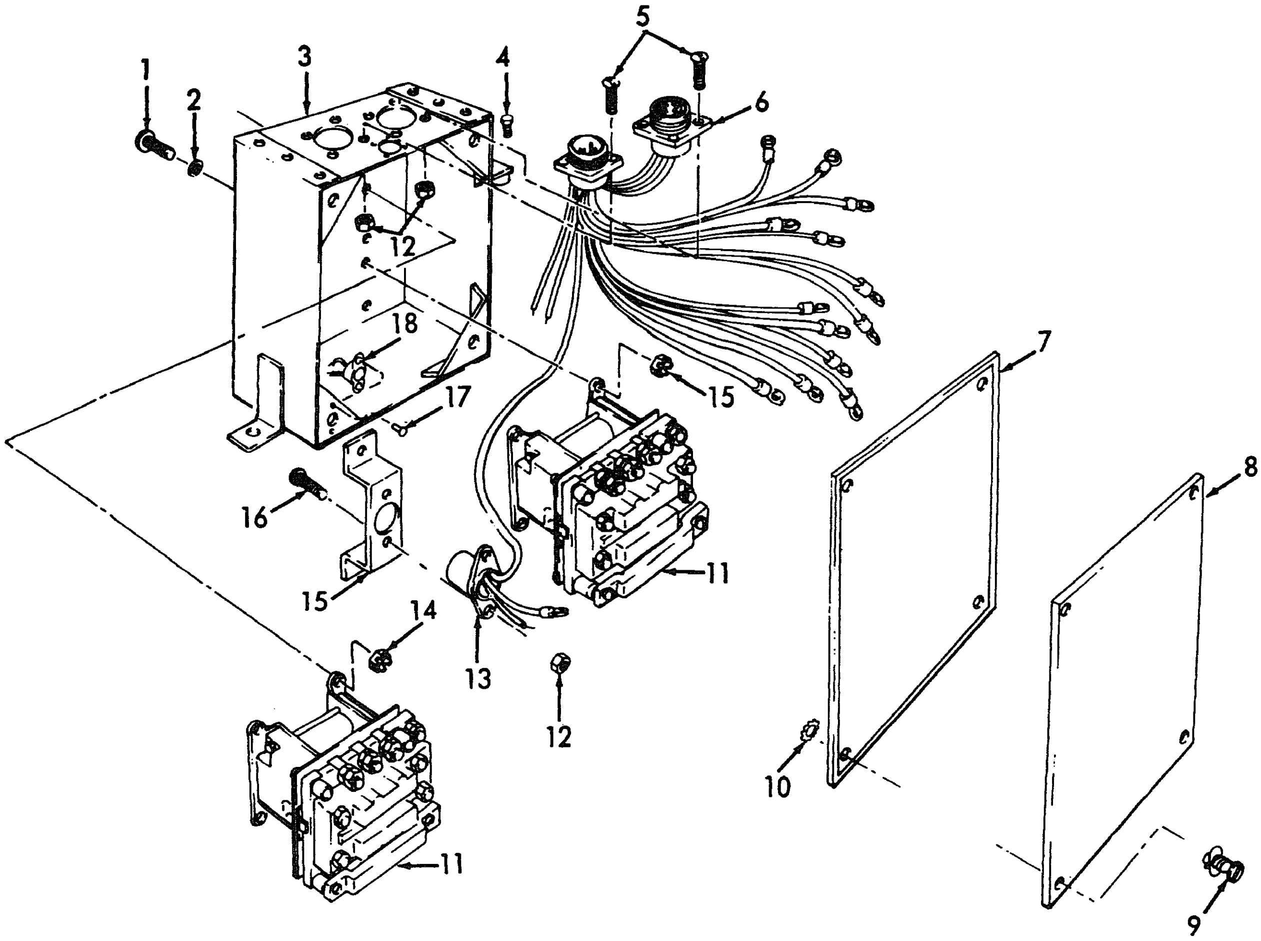

NOTE: TAG AND DISCONNECT ELECTRICAL LEADS AND JUMPERS AND REMOVE CIRCUIT BREAKER MOUNTING HARDWARE AS NECESSARY.
REMOVE NUT (4) BOLT (4), AND CUSHION (4).
EVAPORATOR SECTION FRAME
MOTOR CONTROL ASSEMBLY
MOTOR CONTROL PLUG CONNECTOR (3)
COMPRESSOR MOTOR CIRCUIT BREAKER (2)
HEATER CONTROL PLUG CONNECTOR (2)
MASTER CIRCUIT BREAKER
FAN CIRCUIT BREAKER (2)
HEATER CONTROL ASSEMBLY
HEATER CIRCUIT BREAKER
REMOVE NUT (3) BOLT (3) AND CUSHION (3).
MSC 4120-213-15/47

Figure 4-30. Heater control assembly, motor control assembly, and circuit breakers, removal and installation.



MSC 4120-213-15/48

Figure 4-31. Heater control assembly, disassembly and reassembly.

1 Screw (10 rqr)
2 Washer (10 rqr)
3 Heater control box
4 Screw
5 Screw (8 rqr)
6 Wiring harness
7 Gasket
8 Cover
9 Stud fastener (4 rqr)
10 Washer (4 rqr)
11 Heater control relay (2 rqr)
12 Nut (10 rqr)
13 Time delay relay
14 Nut (10 rqr)
15 Bracket
16 Screw (2 rqr)
17 Rivet (4 rqr)
18 Anchor nut (4 rqr)

Figure 4-31—Continued.

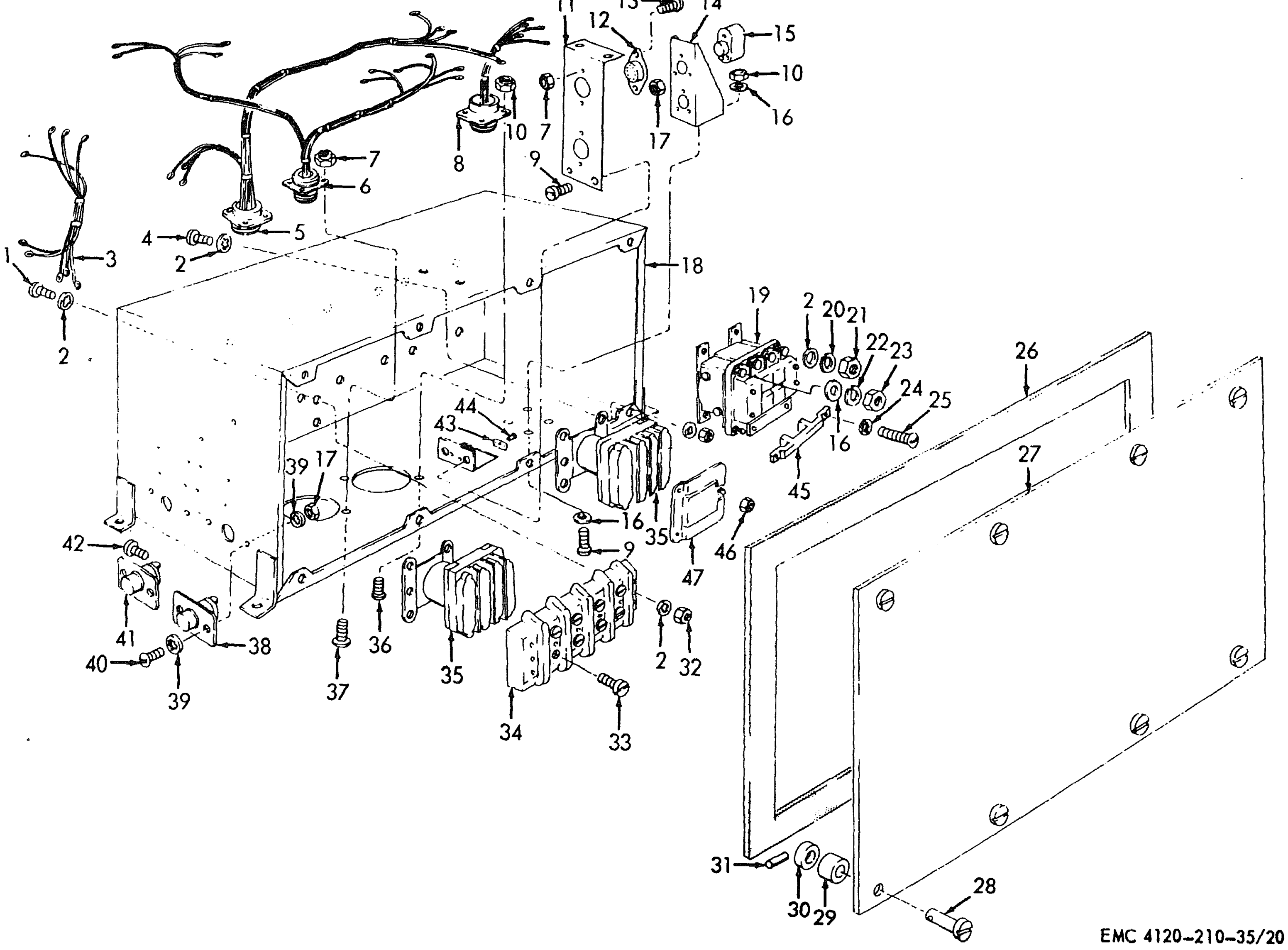


Figure 4-32. Motor control assembly, disassembly and reassembly.

1	Screw (4 rqr)
2	Washer (50 rqr)
3	Wiring harness
4	Screw (12 rqr)
5	Wiring harness
6	Wiring harness
7	Nut (12 rqr)
8	Wiring harness
9	Screw (8 rqr)
10	Nut (8 rqr)
11	Bracket
12	Time delay relay
13	Screw (4 rqr)
14	Bracket
15	Interlock relay
16	Washer (14 rqr)
17	Nut (10 rqr)
18	Motor control box
19	Motor control relay
20	Washer (18 rqr)
21	Nut (18 rqr)
22	Washer (6 rqr)
23	Nut (6 rqr)
24	Washer (4 rqr)
25	Screw (4 rqr)
26	Gasket
27	Cover
28	Stud (8 rqr)
29	Sleeve (8 rqr)
30	Cam (8 rqr)
31	Pin (8 rqr)
32	Nut (16 rqr)
33	Screw (8 rqr)
34	Terminal block
35	Motor control relay
36	Screw (4 rqr)
37	Screw (8 rqr)
38	Evaporator fan reset switch
39	Washer (8 rqr)
40	Screw (8 rqr)
41	Refrigerant system reset switch
42	Screw (4 rqr)
43	Anchor nut (4 rqr)
44	Rivet (8 rqr)
45	Shield (2 rqr)
46	Nut (6 rqr)
47	Shield (2 rqr)

Figure 4-32—Continued.

c. Testing.

(1) *Motor control relay.*

(*a*) Apply a source of 28–volts dc to the motor control relay terminals marked X1 and X2 and inspect the relay action for malfunction. If relay fails to actuate it is defective and must be replaced.

(*b*) Test the two remaining motor control relays in the same manner.

(2) *Interlock relay.*

(*a*) Use a multimeter and test for continuity between the interlock relay terminals marked *2* and *11*. Then test between terminals *3* and *5*. If continuity is not indicated, replace the relay.

(*b*) Apply a source of 28-volts dc between terminals *1* and *10*. Use the multimeter and test between terminals *6* and *7*. If continuity is not indicated, replace the interlock relay.

(*c*) Test the remaining interlock relay in the same manner.

(3) *Time delay relay.*

(*a*) Use a multimeter and test between the time delay relay terminals marked *5* and *7*. If continuity is indicated, replace the relay.

(*b*) Apply a source of 28–volts dc to terminals *2* and *3*. Use the multimeter and test for continuity between terminals *5* and *7*. If continuity is not indicated after 3 second delay, replace the relay.

(*c*) Test the remaining time delay relay in the same manner.

(4) *Wiring harness.* Refer to the wiring diagram (fig. 4–1), and test the leads of the wiring harness by touching the probes of a multimeter to each end of leads. If the multimeter fails to show continuity, the lead is defective and the wiring harness must be replaced.

d. Reassembly. Refer to figure 4–32 and reassemble the motor control assembly.

e. Installation.

(1) Refer to figure 4–30 and install the motor control assembly.

(2) Install the evaporator section rear and right side panels (para 3–23).

4–53. Temperature Control Box

a. Removal.

(1) Remove the evaporator section housing panels (para 3–23).

(2) Refer to figure 4–33 and remove the temperature control box (Models VEA4–3, VEA4–3–102103, VEA4–3–28029, and VEA4–3–28029MOD).

(3) Refer to paragraph 4–48 and remove the temperature control box (Model VEA4–3–102103MOD).

b. Testing (Models VEA4–3, VEA4–3–102103, VEA4–3–28029, and VEA4–3–28029MOD).

(1) Use a multimeter and test between pin A of the 6-pin receptacle and pin E of the 6-pin receptacle. If continuity is not indicated, replace the temperature control box.

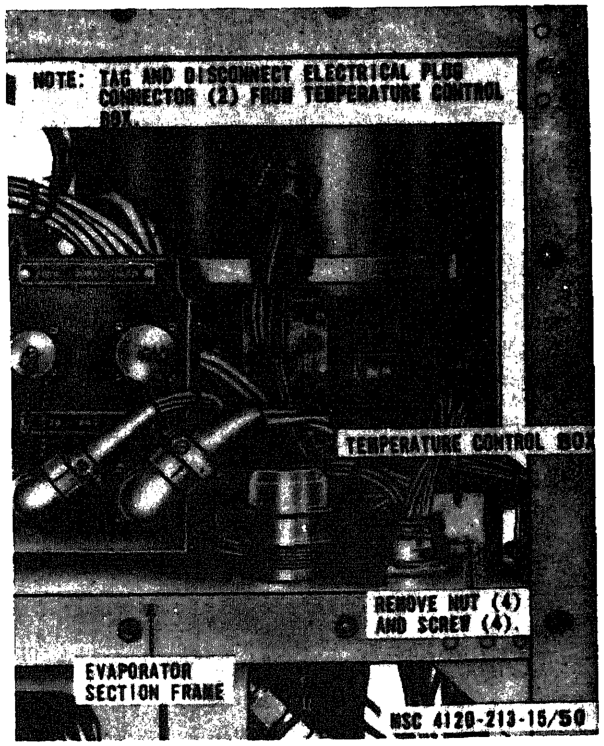

NOTE: TAG AND DISCONNECT ELECTRICAL PLUG CONNECTOR (2) FROM TEMPERATURE CONTROL BOX
TEMPERATURE CONTROL BOX
REMOVE NUT (4) AND SCREW (4).
EVAPORATOR SECTION FRAME
MSC 4120-213-15/50

Figure 4–33. Temperature control box, removal and installation (Models VEA4–3, VEA4–3–102103, VEA4–3–28029, and VEA4–3–28029MCD).

(2) Test between pin A of the 6-pin receptacle and pin A of the 5-pin receptacle. A reading of more than 5 percent above or below 320 ohms indicates a defective limit resistor and the temperature control box must be replaced.

(3) Test between pin B of the 6–pin receptacle and pin B of the 5–pin receptacle. Then test between pins B and E of the 6–pin receptacle. A reading of more than 5 percent above or below 1,200 ohms on either test indicates a defective heat cycle and the temperature control box must be replaced.

(4) Apply 28-volts dc to pins B and C of the 5–pin receptacle. Test between pin C of the 6-pin receptacle and pin B of the 5-pin receptacle. Then test between pins C and D of the 6-pin receptacle. A reading of more than 5 percent above or below 1,200 ohms indicates a defective cool cycle circuit and the temperature control box must be replaced.

c. Testing (Model VEA4–3–102103MOD).

(1) Use a multimeter and test for continuity (fig. 4–34) between pin A of receptacle J–122 and pin E of receptacle J–109, pins E and A of receptacle J–109, pins B and C of receptacle J–109, pin B of receptacle J-109 and pin E of receptacle J–122, and pin B of receptacle J–109 and pin B of receptacle J–122. If continuity is not indicated, the temperature control box is defective and must be replaced.

(2) Energize the temperature control box by applying 28–volts dc across pins B and C of receptacle J–109. Use a multimeter and test for 28–volt dc between pin D of receptacle J–122 and ground. Check for a voltage reading between pin C of receptacle J–122 and ground. If the voltage readings are not indicated on the multimeter, the temperature control box is defective and must be replaced.

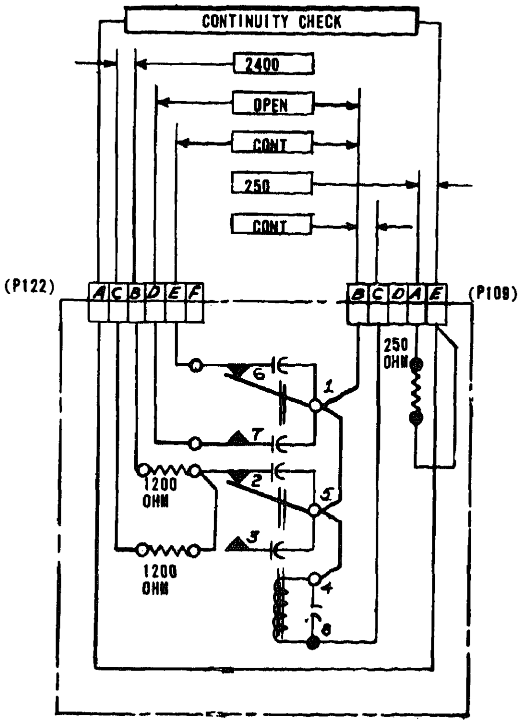


Figure 4–34. Temperature control box continuity check (Model VEA4–3–102103MOD).

d. Installation.

(1) Refer to figure 4–33 and install the temperature control box (Models VEA4–3, VEA4–3–102103, VEA4–3–28029, and VEA4–3–28029MOD).

(2) Refer to paragraph 4–48 and install the temperature control box (Model VEA4–3–102103MOD).

4–54. High Temperature Cutout Switch

a. Removal.

(1) Remove the condenser section front panel (para 3–23).

(2) Refer to figure 4–35 and remove the high-temperature cutout switch.

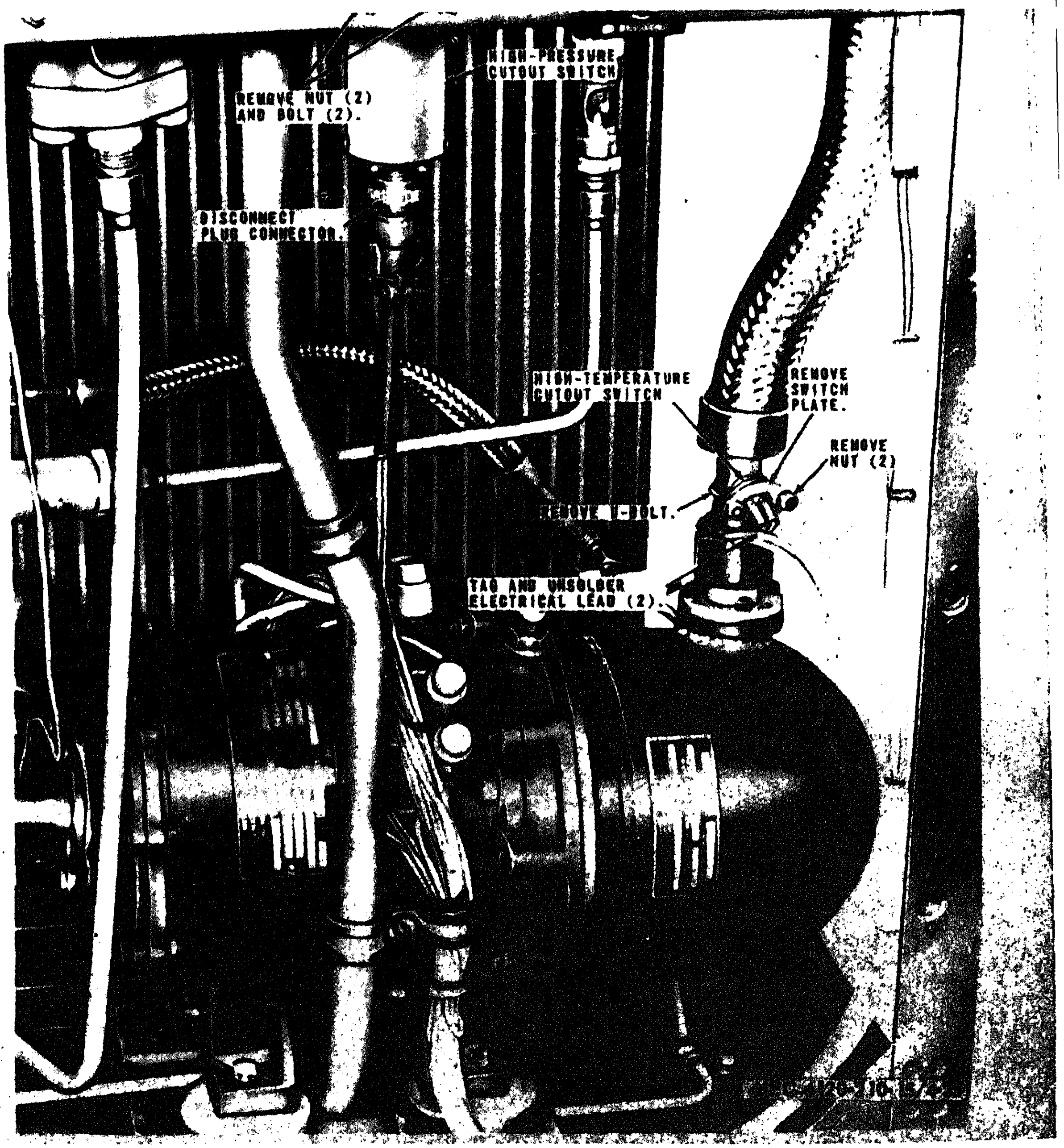

HIGH-PRESSURE CUTOUT SWITCH
REMOVE NUT (2) AND BOLT (2).
DISCONNECT PLUG CONNECTOR.
HIGH-TEMPERATURE CUTOUT SWITCH
REMOVE SWITCH PLATE.
REMOVE NUT (2)
REMOVE U-BOLT.
TAG AND UNSOLDER ELECTRICAL LEAD (2).

Figure 4-35. High-temperature cutout switch and high-pressure cutout switch, removal and installation.

b. Testing. Connect a multimeter to the terminals of the switch and slowly heat the switch in an oven. The reading must indicate continuity at 300°F. Cool the oven slowly. The reading must indicate an open circuit at approximately 270°F. Replace a defective high-temperature switch.

c. Installation.

(1) Refer to figure 4-35 and install the high-temperature cutout switch.

(2) Install the condenser section panel (para 3-23).

4-55. High-Pressure Cutout Switch

a. Removal.

(1) Remove the condenser section front panel (para 3-23).
(2) Refer to figure 4-35 and remove the high-pressure cutout switch.

b. Testing. Using a multimeter set on RX1 scale, test between pins A and B. If continuity is indicated, switch is shorted and must be replaced. Connect the high-pressure cutout switch to a suitable compressed air supply with an adjustable pressure regulator. With the test prods positioned as above, gradually increase the applied air pressure. The switch contacts must close and multimeter should indicate continuity at a pressure between 250 and 270 psi. Decrease the pressure. The contacts must open and multmimeter should indicate infinity at a pressure between 220 and 240 psi. Replace the switch if it does not respond within these test limits.

c. Installation.

(1) Refer to figure 4-35 and install the high-pressure cutout switch.
(2) Install the condenser section front panel (para 3-23).

4-56. Microswitch

a. Removal.

(1) Remove the condenser section top and rear panels (para 3-23).
(2) Refer to figure 4-24 and remove the microswitch.

b. Testing. Use a multimeter and test for continuity between the normally closed terminal and the common terminal. If continuity is not indicated, the microswitch is defective. Depress the switch actuating arm and test for open contacts. Replace a defective microswitch.

c. Installation.

(1) Refer to figure 4-24 and install the microswitch.
(2) Install the condenser section top and rear panels (par 3-23).

4-57. Rectifier and Power Transformer

a. Removal.

(1) Remove the evaporator fan (para 4-41).
(2) Refer to figure 4-36 and remove the rectifier and power transformer.

b. Testing.

(1) *Power transformer.*

(*a*) Use a multimeter and test between the transformer terminals marked 1 and 2, 3 and 4, 5 and 6, and 6 and 7. If continuity is not indicated on any of these tests, an open circuit is indicated and the transformer must be replaced.

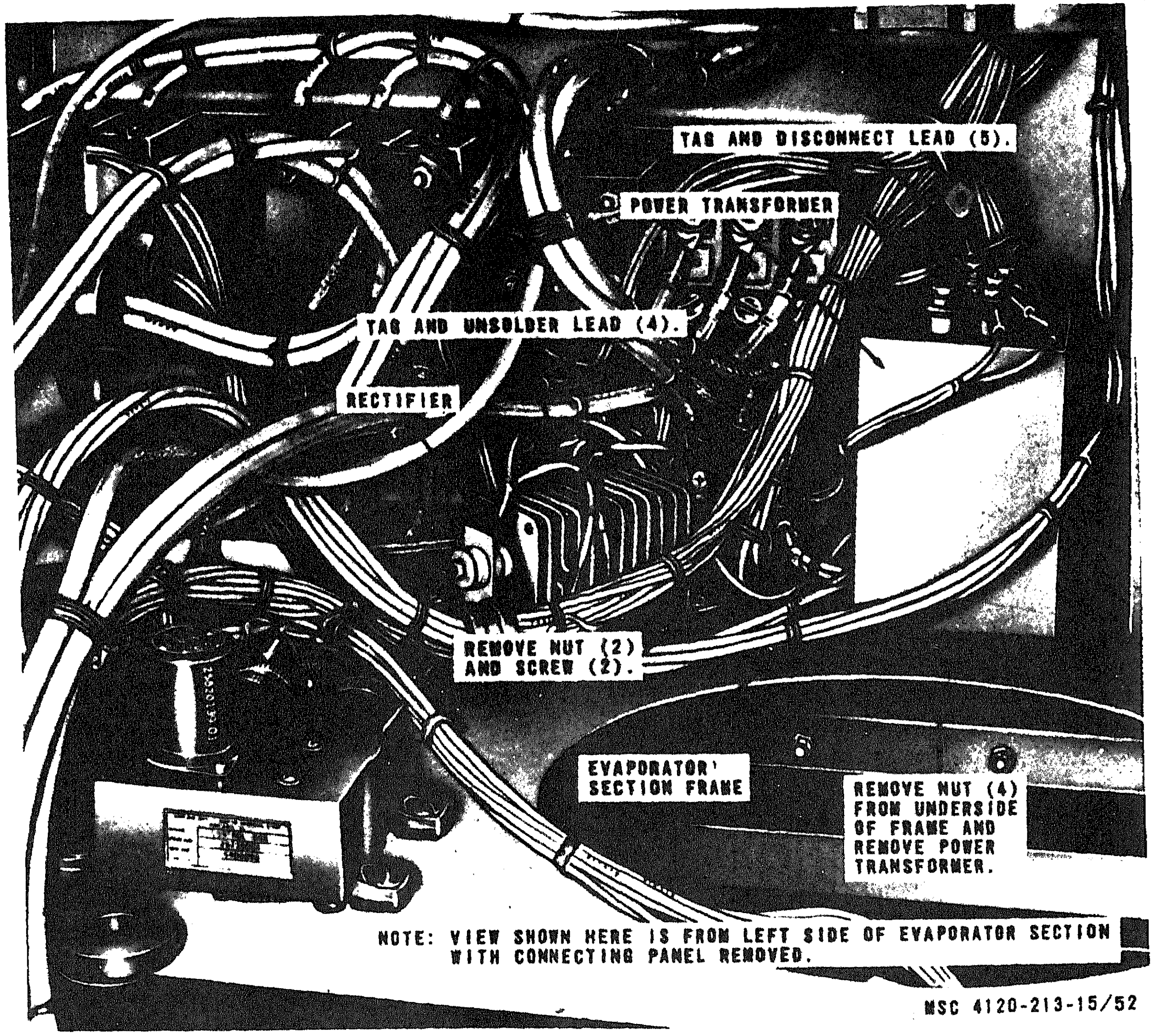
(*b*) Use a megohmeter and test between the transformer case and terminals 1, 3, and 5, in turn, and between terminals 1 and 3, 1 and 5, and 3 and 5. A reading of less than 0.4 megohms indicates faulty insulation and the transformer must be replaced.

(*c*) Install a connecting link between terminals 2 and 3 and connect a source of 416-volts (Model VEA4-3) or 208 volts (remaining models), 400-cycle, single - phase ac to terminals 1 and 4. Connect an ac voltmeter between teminals 5 and 7. With the input voltage adjusted to exactly 416 volts (Model VEA-4-3) or 208 volts (remaining models) the voltmeter on terminals 5 and 7 should indicate 60.4 volts. Replace a defective power transformer.

(2) *Rectifier.* Use a multimeter and test between one of the rectifier end terminals and the red connector bar. Check the reading. Reverse the probes and test between the other end terminal and the bar. Resistance should be very high in one direction and very low in the other direction. If continuity is indicated in both directions the rectifier is shorted. If no resistance is indicated, the circuit is open and the rectifier is defective. Replace a defective rectifier.

c. Installation.

(1) Refer to figure 4-36 and install the power transformer and rectifier.



TAG AND DISCONNECT LEAD (5).

TAG AND UNSOLDER LEAD (4).

REMOVE NUT (2) AND SCREW (2).

REMOVE NUT (4) FROM UNDERSIDE OF FRAME AND REMOVE POWER TRANSFORMER.

NOTE: VIEW SHOWN HERE IS FROM LEFT SIDE OF EVAPORATOR SECTION WITH CONNECTING PANEL REMOVED.

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Figure 4-36. Rectifier and power transformer, removal and installation.

(2) Install the evaporator fan (para 4-41).

4-58. Wiring Harness Assemblies

a. General. The electrical circuits in the air conditioners are completed by individual wire leads or by leads inclosed in a loom to form a harness. All of the wiring carries code numbers. Refer to the wiring diagram (fig. 4-1) when testing, repairing, or replacing the wiring harness.

b. Testing. Test a wire for continuity by disconnecting each end from the component or components to which it is connected. Touch th test probes of a multimeter to each end. If con tinuity is not indicated, the wire is defectiv and must be repaired or replaced (*c* and *d* b low).

c. Repair. Remove the insulation to expos one-half inch of bare wire on both ends of th breaks. Twist the bare wire together and solde the connection. Cover the repaired break wit electrical tape and friction tape. Do not leav any bare wire exposed. If a terminal lug break off a wire, replace it with an exact duplicat

d. Replacement. To replace a wire, disconnect it at both ends and connect a new wire to the component or components from which the old wire was removed. If a broken wire is part of a wiring harness, disconnect the wire at both ends and tape the ends with electrical tape. Install a new wire and attach it to the outside of the wiring harness.

4-59. Heater

a. Removal. Remove the heater (para 4-39).

d. Disassembly. Refer to figure 4-37 and disassemble the heater.

c. Testing.

(1) *Tubular heaters.*

(*a*) Use a multimeter and test between the terminals of one of the tubular heaters. If continuity is not indicated, replace the heater.

(*b*) Use a megohmeter and test between the shell of the tubular heater and one of the teminals. A reading of less than 0.4 megohn indicates faulty insulation and the tubular heater must be replaced.

(*c*) Use a multimeter and test between both terminals. A reading of 52 ohms ±5 percent should be indicated. If reading is not within these limits, replace tubular heater.

(*d*) Test the remaining 11 tubular heaters in the same manner.

(2) *Wiring harness.* Refer to the wiring diagram (fig. 4-1) and test the leads of the wiring harness by touching the probes of a multimeter to each end of the leads. If continuity is not indicated, the lead is defective and the harness must be replaced.

d. Reassembly. Refer to figure 4-37 and reassemble the heater.

e. Installation. Install the heater (para 4-39).

4-60. Circuit Breakers

Refer to figure 4-30 for removal and installation of the circuit breakers.

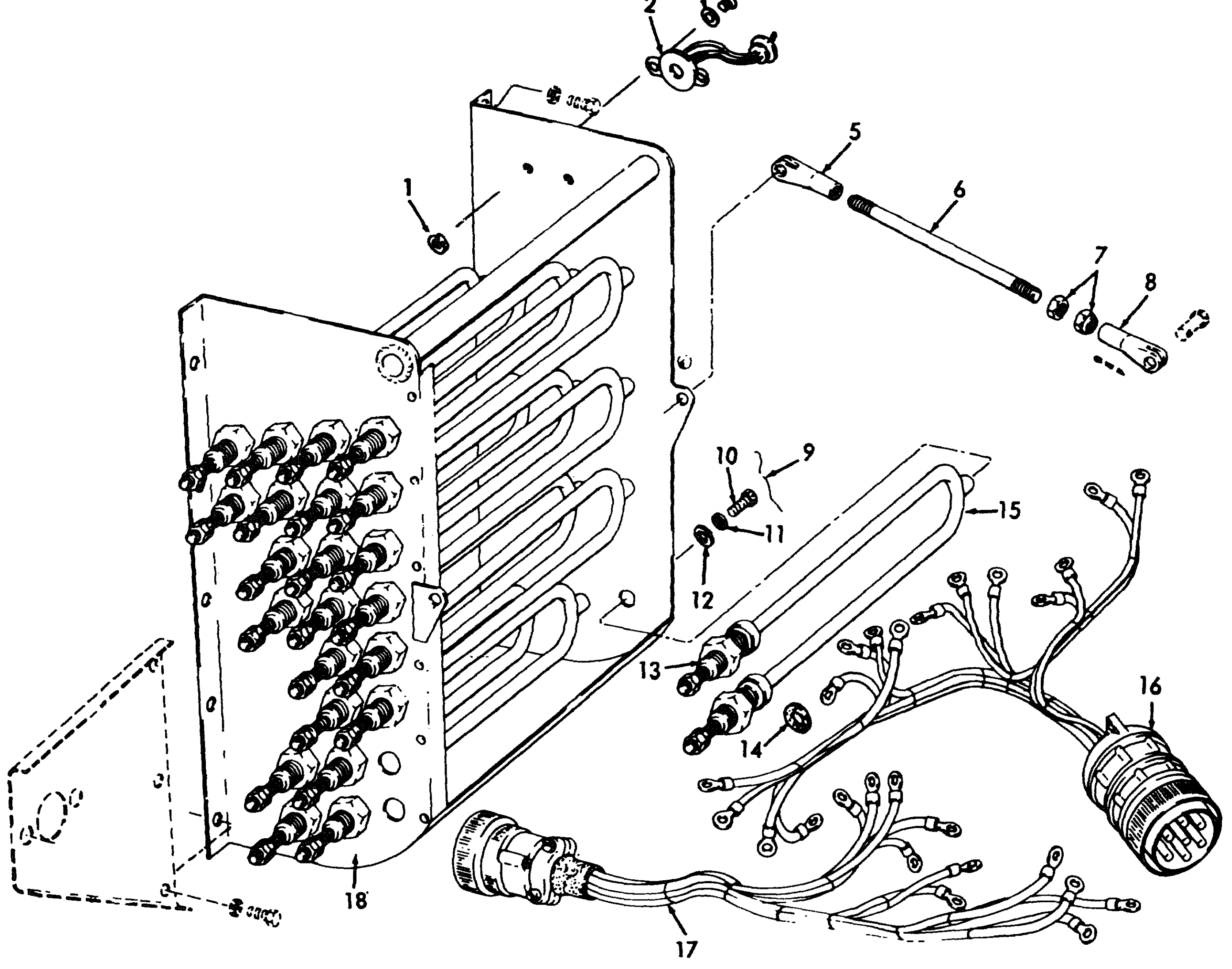

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Figure 4-37. Heater, disassembly and reassembly.

1 Nut (2 rqr)
2 Cable assembly
3 Washer (2 rqr)
4 Screw (2 rqr)
5 End (2 rqr)
6 Heater support rod (2 rqr)
7 Nut (4 rqr)
8 End (2 rqr)
9 Lockwire (8 rqr)
10 Bolt (12 rqr)
11 Washer (12 rqr)
12 Nonmetallic washer (12 rqr)
13 Nut (24 rqr)
14 Gasket (24 rqr)
15 Tubular heater (12 rqr)
16 Wiring harness
17 Wiring harness
18 Manifold

Figure 4-37—Continued.

Section IX. FRAME ASSEMBLIES

1. General

he evaporator and condenser section frames constructed of welded, and riveted alumi- , fitted with the necessary members, brack- and bulkheads required to support and nt the components of the air conditioners. lown and lifting facilities are provided by ng bolts and spacers built into each section ne.

2. Evaporator Section Frame

Removal.

(1) Remove the solenoid valve (para 4–37).
(2) Remove the evaporator and heater (para 4–39).
(3) Remove the heater control assembly (para 4–51).
(4) Remove the motor control assembly (para 4–52).
(5) Remove the temperature control box (para 4–53).
(6) Remove the rectifier and power transformer (para 4–57).
(7) Remove the circuit breakers (para 4–60).
(8) Remove the fuseholder assembly (para 3–30).

. *Disassembly and Reassembly.* Refer to ure 4–38 and disassemble and reassemble the porator section frame assembly.

ote. Although components may differ slightly on various models all are disassembled in a similar ner.

. *Installation.*

(1) Install the fuseholder assembly (para 3–30).
(2) Install the circuit breakers (para 4–60).
(3) Install the rectifier and power transformer (para 4–57).
(4) Install the temperature control box (para 4–53).
(5) Install the motor control assembly (para 4–52).
(6) Install the heater control assembly (para 4–51).
(7) Install the evaporator and heater (para 4–39).
(8) Install the solenoid valve (para 4–37).

4–63. Condenser Section Frame

a. Removal.

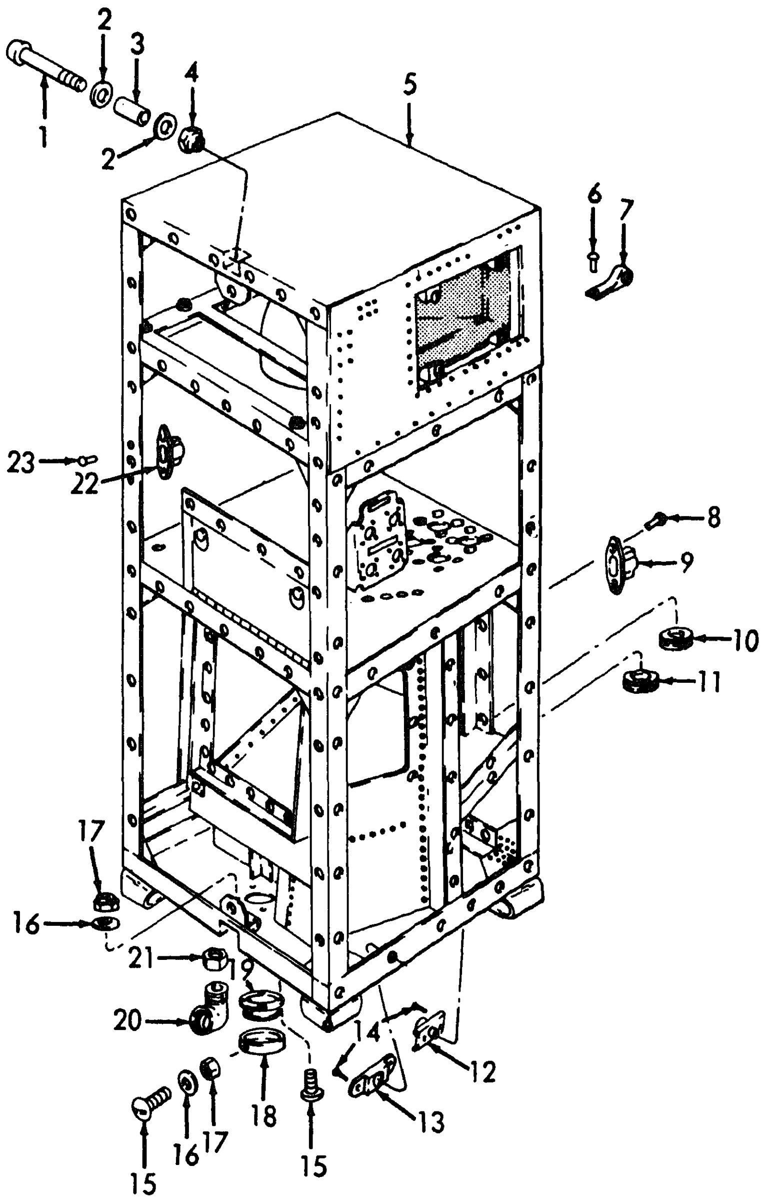
(1) Remove the purge, charge, and drain valves (para 4–31).
(2) Remove the oil separator and liquid quench valve (para 4–32).
(3) Remove the hot gas bypass valve (para, 4–33 or 4–34).
(4) Remove the pressure relief valve (para 4–35).
(5) Remove the condenser and subcooler (para 4–36).
(6) Remove the microswitch (para 4–56).
(7) Remove the condenser fan (para 4–42).

b. Disassembly and Reassembly. Refer to figure 4–39 and disassemble and reassemble the condenser section frame.

Note. Although components may differ slightly on the various models all are disassembled in a similar manner.

c. Installation.

(1) Install the condenser fan (para 4–42).
(2) Install the microswitch (para 4–56).
(3) Install the condenser and subcooler (para 4–36).
(4) Install the pressure relief valve (para 4–35).
(5) Install the hot gas bypass valve (para 4–33 or 4–34).
(6) Install the oil separator (para 4–32).
(7) Install the purge, charge, and drain valves (para 4–31).



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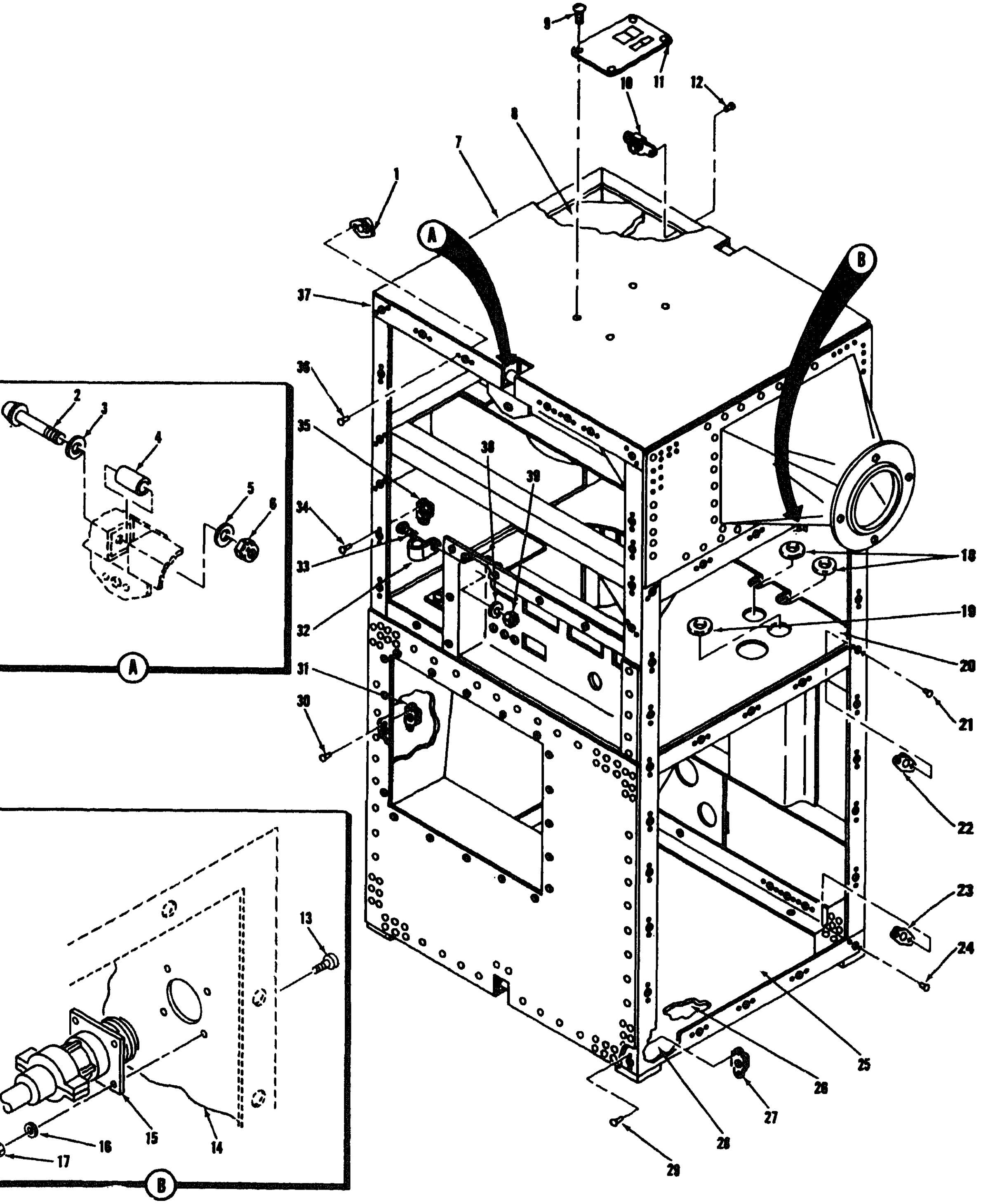
1	Screw (3 rqr)
2	Washer (6 rqr)
3	Frame lifting bolt spacer (3 rqr)
4	Nut (3 rqr)
5	Evaporator section frame
6	Rivet (8 rqr)
7	Nut (4 rqr)
8	Rivet (12 rqr)
9	Anchor nut (6 rqr)
10	Grommet (2 rqr)
11	Rubber grommet (2 rqr)
12	Nut (3 rqr)
13	Anchor nut (3 rqr)
14	Rivet (6 rqr)
15	Screw (2 rqr)
16	Washer (2 rqr)
17	Nut (2 rqr)
18	Cover assembly
19	Air duct cover
20	Elbow
21	Nut
22	Receptacle fastener (168 rqr)
23	Rivet (336 rqr)

Models VEA4-3, VEA4-3-28029 and VEA4-3-28029MOD

Figure 4–38. Evaporator section frame, disassembly and reassembly.



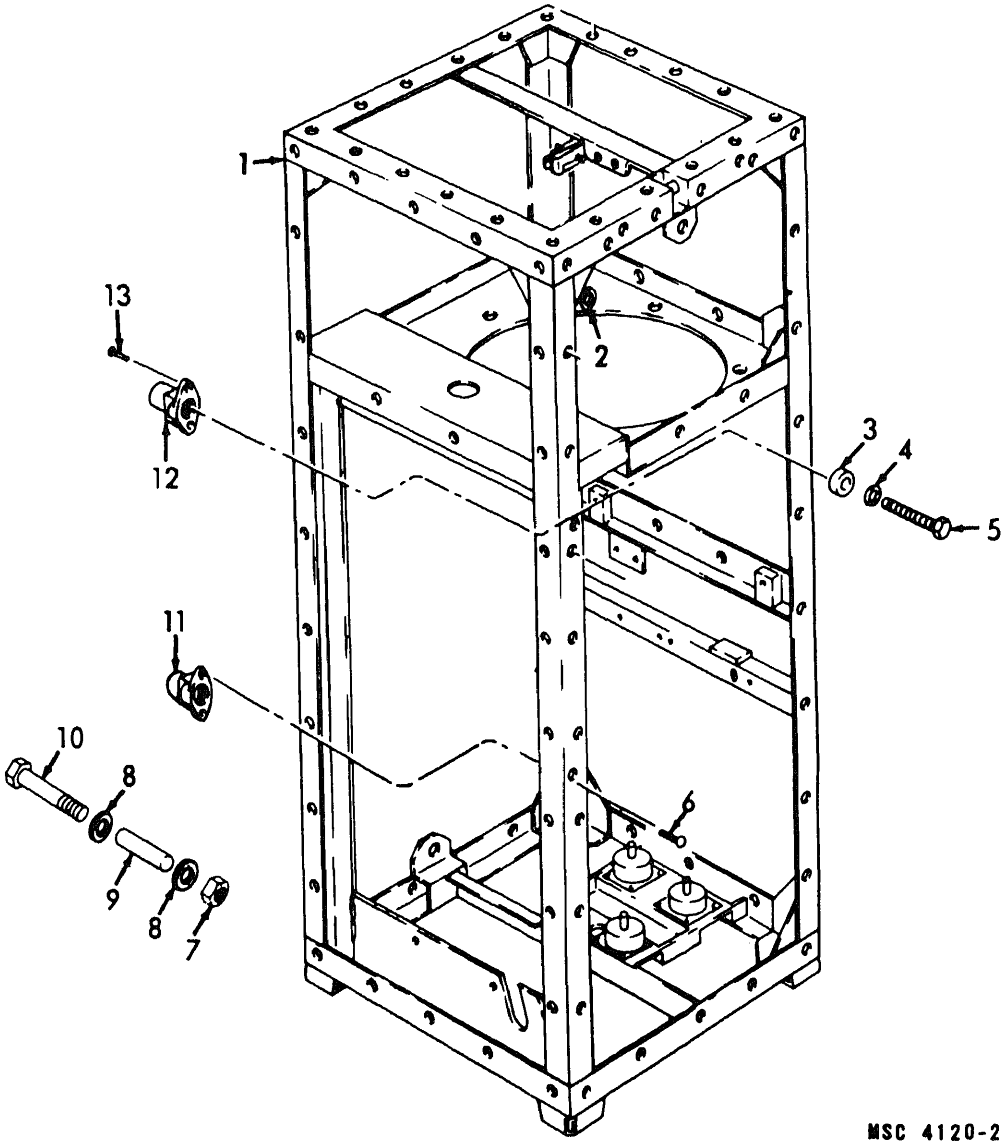
MEC 4120-210-15/4-38 ②

Models VEA4-3-102108 and VEA4-3-102108MOD

Figure 4-38—Continued.

1	Anchor nut	14	Right side panel	27	Anchor nut
2	Bolt	15	Wiring harness	28	Insulation
3	Washer	16	Washer	29	Rivet
4	Spacer	17	Nut	30	Rivet
5	Washer	18	Grommet	31	Anchor nut
6	Nut	19	Grommet	32	Clamp
7	Panel	20	Panel	33	Screw
8	Insulation	21	Rivet	34	Rivet
9	Screw	22	Stud receptacle	35	Stud receptacle
10	Anchor nut	23	Stud receptacle	36	Rivet
11	Identification plate	24	Rivet	37	Evaporator stage frame
12	Rivet	25	Panel	38	Washer
13	Screw	26	Insulation	39	Nut

Figure 4-38—Continued.



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1	Condenser section frame
2	Grommet
3	Washer, nonmetallic (8 rqr)
4	Washer (8 rqr)
5	Bolt (8 rqr)
6	Rivet (298 rqr)
7	Nut (3 rqr)
8	Washer (6 rqr)
9	Lifting eye spacer (3 rqr)
10	Screw
11	Stud fastener, receptacle
12	Anchor nut (8 rqr)
13	Rivet (16 rqr)

Figure 4–39. Condenser section frame, disassembly and reassembly.

APPENDIX A

REFERENCES

A–1. Fire Protection

TM 5–4200–200–10	Hand Portable Fire Extinguishers for Army Use.

A–2. Painting

TM 9–213	Painting Instructions for Field Use.

A–3. Preventive Maintenance

TM 38–750	Army Equipment Record Procedures.
TM 5–764	Electric Motor and Generator Repair.

A–4. Supply Publications

TM 5–4120–210–25P	Organizational, Direct and General Support and Maintenance Repair Parts Manual.

APPENDIX B

BASIC ISSUE ITEM LIST AND OPERATING SUPPLIES

Section I. INTRODUCTION

B-1. Scope

This appendix lists items which accompany the air conditioners or are required for installation, operation, or operator's maintenance. Section 2 lists the accessories, tools, and publications required for the maintenance and operation by the operator, initially issued or authorized with the equipment. Section 3 lists the maintenance and operating supplies required for initial operation.

B-2. Explanation of Columns

The following provides an explanation of columns in the tabular list in section 2:

a. Source, maintenance and recoverability Codes (colm 1).

(1) Source code, column 1*a*, indicates the selection status and source for the listed item. Source codes are —

Code	Explanation
P	Applies to repair parts which are stocked in or supplied from the GSA/DSA Army supply system, and authorized for use at indicated maintenance categories.

(2) Maintenance code, column 1*b*, indicates the lowest category of maintenance authorized to install the listed item. The maintenance level code is—

Code	Explanation
O	Organization maintenance (operator/crew)

(3) Recoverability code, column 1*c*, indicates whether unserviceable items should be returned for recovery or salvage. Items not coded are expendable. Recoverability codes are—

Code	Explanation
R	Applied to repair parts and assemblies which are economically repairable at DSU and GSU activities and normally are furnished by supply on an exchange basis.
T	Applied to high dollar value recoverable repair parts which are subject to special handling and are issued on an exchange basis. Such repair parts are normally repaired or overhauled at depot maintenance activities.
U	Applied to repair parts specifically selected for salvage by reclamation units because of precious metal content, critical materials, high dollar value reusable casings and castings, etc.

b. Federal Stock Number. Column 2, indicates the Federal Stock Number for the item.

c. Description. Column 3, indicates the Federal item name and any additional description required. A five-digit manufacturer's or other service code is shown in parentheses followed by the manufacturer's part number. Repair parts quantities included in kits, sets, and assemblies that differ from the actual quantity used in the specific item are listed in parentheses following the repair part name.

d. Unit of Issue. Column 4, indicates the unit used as a basis for issue, e.g., ea, pr, ft, yd, etc.

e. Quantity Incorporated in Unit Pack. Column 5, indicates the actual quantity contained in the unit pack.

f. Quantity Incorporated in Unit. Column 6, indicates the quantity of the item used on the equipment.

g. Quantity Authorized. Column 7, indicates the total quantity of an item required to be on hand and necessary for operation and maintenance of the equipment. Items to be requisitioned as required are indicated by an asterisk.

h. Illustration (colm 8).

(1) *Figure number.* Column 8*a* indicates the figure number of the illustration in which the item is shown.

(2) *Item or symbol number.* Column 8*b*, indicates the callout number used to reference the item in the illustration.

B-3. Explanation of Columns Contained in Section 3

a. Item. This column contains numerical sequence item numbers assigned to each component application to facilitate reference.

b. Component Application. This column identifies the component application of each maintenance or operating supply item.

c. Federal Stock Number. The Federal stock number will be shown in this column and will be used for requisitioning purposes.

d. Description. The item and a brief description are shown.

e. Quantity Required for Initial Operation. This column lists the quantity of each maintenance or operating supply item required for initial operation of the equipment.

f. Quantity Required for 8 Hours Operation. Quantities listed represent the estimated requirements for an average 8 hours of operation.

Section II. BASIC ISSUE ITEMS LIST

(1) Source maint and Recov Code			(2) Federal Number stock	(3) Description	(4) Unit of issue	(5) Qty inc in unit pack	(6) Qty inc in unit	(7) Qty auth	(8) Illustration	
(A) Source	(B) Maint	(C) Recov							(A) Fig No	(B) Item or Sym No
				31—BASIC ISSUE ITEMS, MANUFACTURER INSTALLED						
				3100—BASIC ISSUE ITEMS MANUFACTURER OR DEPOT INSTALLED						
P	O	—	7520-559-9618	CASE, OPERATIONS AND MAINTENANCE PUBLICATIONS: cotton duck, water-repellent, mildew-resistant MIL-B-11743.	—	—	1	1		
				DEPARTMENT OF THE ARMY OPERATOR'S, ORGANIZATIONAL, DIRECT AND GENERAL SUPPORT AND DEPOT MAINTENANCE MANUAL TM 5-4120-210-15	—	—	1	1		
P	O	—	4130-542-3339	FILTER, AIR	—	—	1	1		
P	O	—	4138-860-0042	OIL, FILTER: water soluble	—	—	*	1		

APPENDIX C

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

C–1. General

a. Section I provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. Section II designates overall responsibility for the performance of maintenance operations on the identified end item or component. The implementation of the maintenance tasks upon the end item or component will be consistent with the assigned maintenance operations.

c. No special tools and test equipment required for each maintenance operation as referenced from section II.

d Section III contains supplemental instructions, explanatory notes and/or illustrations required for a particular maintenance function.

C–2. Explanation of Columns in Section II

a. Functional Group Number. The functional group is a numerical group set up on a functional basis. The applicable functional grouping indexes (obtained from TB 750–93–1 Functional Grouping Codes) are listed on the MAC in the appropriate numerical sequence. These indexes normally are set up in accordance with their function and proximity to each other.

b. Component Assembly Nomenclature. This column contains a brief description of the components of each functional group.

c. Maintenance Operations and Maintenance Levels. This column lists the various maintenance operations (A through J) and indicated the lowest maintenance level authorized to perform these operations.

The symbol designations for the various maintenance levels are as follows:

C—Operator or crew
O—Organizational maintenance
F—Direct support maintenance
H—General support maintenance
D—Depot maintenance

The maintenance operations are defined as follows:

A—SERVICE:

Operations required periodically to keep the item in proper operating condition, i.e., to clean, preserve, drain, paint, and replenish fuel, lubricants, hydraulic, and deicing fluids, or compressed air supplies.

B—ADJUST:

Regulate periodically to prevent malfunction. Adjustments will be made commensurate with adjustment procedures and associated equipment specifications.

C—ALINE:

Adjust two or more components of an electrical or mechanical system so that their functions are properly synchronized or adjusted.

D—CALIBRATE:

Determine, check, or rectify the graduation of an instrument, weapon, or weapons system of components of a weapons system.

E—INSPECT:

Verify serviceability and detect incipient electrical or mechanical failure by close visual examination.

F—TEST:

Verify serviceability and detect incipient electrical or mechanical failure by measuring the mechanical or electrical characteristics of the item and comparing those characteristics with authorized standards. Tests will be made commensurate with test procedures and with calibrated tools and/or test equipment referenced in the MAC.

G—REPLACE:

Substitute serviceable components, assemblies and subassemblies for unserviceable counterparts or remove and install the same item when required for the performance of other maintenance operations.

H—REPAIR:

Restore to a serviceable condition by replacing unserviceable parts or by any other action required using available tools, equipment and skills—to include welding, grinding, riveting, straightening, adjusting, and facing.

I—OVERHAUL:

Restore an item to a completely serviceable condition (as prescribed by serviceability standards developed and published by the commodity commands) by employing techniques of "Inspect and Repair Only as Necessary" (IROAN). Maximum use of diagnostic and test equipment is combined with minimum disassembly during overhaul. "OVERHAUL" may be assigned to any level of maintenance except organizational, provided the time, tools, equipment, repair parts authorization, and technical skills are available at that level. Normally, overhaul as applied to end items, is limited to depot maintenance level.

J—REBUILD:

Restore to a condition comparable to new by disassembling to determine the condition comparable to new by disassembling to determine the condition of each component part and reassembling using serviceable, rebuilt, or new assemblies, subassemblies, and parts.

d. Reference Note. This column, subdivided into columns K and L, is provided for referencing Maintenance Functions (sec III) that may be associated with maintenance operations (sec II).

C-3. Explanation of Columns in Section III

a. Reference Code. This column consists of two letters separated by a dash, both of which are references to section II. The first letter references column L and the second letter references a maintenance operation, column A through J.

b. Remarks. This column lists information pertinent to the maintenance operation being performed, as indicated on the MAC section II.

Section II. MAINTENANCE ALLOCATION CHART

Functional group No.	Component Assembly Nomenclature	Essentiality	Maintenance Operations / Maintenance levels										Note ref	
			A	B	C	D	E	F	G	H	I	J	K	L
			Service	Adjust	Aline	Calibrate	Inspect	Test	Replace	Repair	Overhaul	Rebuild	T and TE rqm	Remarks
	BTU, 208 V (FAIRCHILD MODEL VEA 4-3-28029) MODIFIED FSN 4120-225-9752													
15	FRAME, TOWING ATTACHMENTS, AND DRAW-BARS													
1501	FRAME Assembly:													
	Frame assemblies	—	—	—	—	—	—	—	D					
18	BODY, CAB, HOOD AND HULL													
1801	Body, Cab, Hood, Hull Assemblies:													
	Cable, control assembly, fresh air	—	—	—	—	—	—	—	O	O				
1801	Body, Cab, Hood, Hull Assemblies: (Cont'd)													
	Cover assembly, evaporator heater door assembly.	—	—	—	—	—	—	—	O	O				
	Duct, fresh air; insulation	—	—	—	—	—	—	—	O					
	Panel assemblies, condenser section	—	—	—	—	—	—	—	O	O				
	Panel assemblies, evaporator section right side panel and condenser section left side.	—	—	—	—	—	—	—	F	F				
22	BODY CHASSIS OR HULL, AND ACCESSORY ITEMS													
2210	Data Plates:													
	Plates, data	—	—	—	—	—	—	—	F					
	Plates, identification	—	—	—	—	—	—	—	O					
33	SPECIAL PURPOSE KITS													
3303	Winterization Kit:													
	Wiring harness	—	—	C	—	—	—	—	F	O				
	Thermostat	—	—	C	—	—	—	—	O					
	Motor, fan	—	—	C	—	—	—	—	O					
	Circuit breaker; switches; fan	—	—	—	—	—	—	—	O					
40	ELECTRIC MOTORS													
4000	Motor Assembly:													
	Motor, compressor	—	—	—	—	—	—	—	D	D	D			
	Motor, evaporator and condenser fan.	—	—	—	—	—	—	—	F	F	H			
4001	Rotor Assemblies:													
	Rotor assemblies, condenser and evaporator.	—	—	—	—	—	—	—	F	F				
	Rotor assembly, compressor	—	—	—	—	—	—	—	D	D				
4002	Stator Assemblies:													
	Stator assemblies, condenser and evaporator.	—	—	—	—	—	—	F	F	F	D			
	Stator assemblies, compressor	—	—	—	—	—	—	—	D	D	D			
4005	Frame Support and Housing:													
	Bearing, condenser and evaporator	—	—	—	—	—	—	—	F					
	Bearings, compressor	—	—	—	—	—	—	—	D					
4010	Master or Auxiliary Control Assembly:													
	Control 1 assembly, remote	—	—	—	—	—	—	—	O	F				
4018	Terminal Block, Junction Boxes:													
	Clamps; connectors, grommets; lugs; plugs.	—	—	—	—	—	—	—	F					
	Receptacle, remote control	—	—	—	—	—	—	—	O					
42	ELECTRICAL EQUIPMENT													
4202	Electrical Controls:													
	Control assembly, heater and motor	—	—	—	—	—	—	—	F	F				

No.	Component Assembly Nomenclature	Essentiality	Maintenance Operations / Maintenance levels A Service	B Adjust	C Aline	D Calibrate	E Inspect	F Test	G Replace	H Repair	I Overhaul	J Rebuild	Note ref K T and TE rqm	L Remarks
203	Circuit Breakers, Cutout Devices, Fuse and Fuse Holders:													
	Circuit breaker	--	--	--	--	--	--	--	F					
	Holder, fuse	--	--	--	--	--	--	--	O					
	Fuse	--	--	--	--	--	--	--	C					
	Switches; relays	--	--	--	--	--	--	--	F					
4205	Control Resistances:													
	Rheostat, remote control	--	--	--	--	--	--	--	F					
4213	Nonrotating Rectifiers:													
	Rectifier; transformer	--	--	--	--	--	--	--	F					
4216	Miscellaneous Wiring and Fittings:													
	Wiring harness; leads	--	--	--	--	--	--	--	F	F				
	Cover; receptacles	--	--	--	--	--	--	--	F					
	REFRIGERATION AND AIR CONDITIONING COMPONENTS													
5200	Gas Compressor Assembly	--	F	--	--	--	--	F	F	D	D	--	--	A
5216	Oil Piping:													
	Tube assemblies	--	--	--	--	--	--	--	F					
	Sight glass, flow indicator; filter	--	--	--	--	--	--	--	F					
4217	Refrigerant Piping:													
	Tube assemblies	--	--	--	--	--	--	--	F					
	Valves, relief, charging and by-pass; valve, solenoid.	--	--	--	--	--	--	--	F					
5228	Oil Separator:	--	--	--	--	--	--	--	F					
5230	Condenser:													
	Condenser assembly	--	O	--	--	--	--	--	F	F				
	Subcooler	--	--	--	--	--	--	--	F					
5241	Evaporator:													
	Evaporator assembly	--	O	--	--	--	--	--	F	F				
5243	Blower Assembly:													
	Fan assembly, evaporator and condenser.	--	--	--	--	--	--	--	F	F				
5244	Thermostatic Controls:													
	Thermostat	--	--	--	--	--	--	--	O	O				
5245	Air Filters:													
	Filter, air	--	C	--	--	--	--	--	O					
5247	Heating Units:													
	Heater assembly													
	Manifold	--	--	--	--	--	--	--	F					
5247	Heating Units: (Cont'd)													
	Rod assembly	--	--	--	--	--	--	--	F					
	Heater assembly	--	--	--	--	--	--	--	F					

Section III. MAINTENANCE FUNCTIONS

Reference code	Remarks
A—H	Repair motor only.

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By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
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al:

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or General, United States Army,
Adjutant General.

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